DOCUMENT RESUME

ED 313 210 RC 017 354

AUTHOR	Wolanyk, Betty
TITLE	New York Agriculture in the Classroom. Grade 4.
INSTITUTION	New York Farm Bureau, Inc., Albany.; New York State Dept. of Agriculture and Markets, Albany.; New York State Education Dept., Albany.; State Univ. of New York, Ithaca. Coll. of Agriculture and Life Sciences at Cornell Univ.
PUB DATE	87
NOTE	191p.; Poster will not reproduce.
AVAILABLE FROM	Cornell University, Dept. of Education, 24 Roberts Hall, Ithaca, NY 14853 ($54.00 postpaid).
PUB TYPE	Guides - Classroom Use - Materials (For Learner) (051) -- Reference Materials - Bibliographies (131)
EDRS PRICE	MF01/PC08 Plus Postage.
DESCRIPTORS	*Agriculture; *Animals; Class Activities; Educational Resources; Elementary School Science; Farm Occupations; *Food; Grade 4; Intermediate Grades; Mathematics Materials; Rural Education; Science Activities; Social Studies; Writing Exercises
IDENTIFIERS	*New York; *Plants (Botany)

ABSTRACT

These classroom exercises have been designed to maximize teacher time, while creating an awareness of our food and fiber system among New York fourth graders. The materials are color-coded, falling into four categories: language arts, mathematics, science, and social studies. Each exercise includes background information, concepts, and objectives for the teacher. Word puzzles, stories, games, and writing exercises in the language arts series help students learn composition, reading, and agricultural terminology. Word problems in the mathematics section have to do with agricultural production and help students learn addition, subtraction, multiplication, and rounding numbers. Material in the science section teaches students the relationship between agriculture and the life cycles of plants and animals. Activities include observing life cycles of animals and plants in the classroom. The social studies materials help children think about issues of culture and interdependence. Activities include creating a pictorial timeline of agricultural history and encouraging class discussion about farming lifestyles. Another unit studies the use of plants as medicines and food in the early American colonies. The document also offers word puzzles and line drawings for students to color. Additional resources include "New York Is Growing"--a children's workbook on New York agriculture, a wall poster, and a U.S. Department of Agriculture bibliography of 328 educational resources about agriculture. (TES)

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NEW YORK AGRICULTURE IN THE CLASSROOM

Grade 4

RC017354

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New York Agriculture in the Classroom

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New York State Department of Agriculture and Markets
New York State Education Department

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November 1, 1987

Dear Educator:

These materials have been designed to maximize teacher time, address the concepts in the syllabus for each subject area and create an awareness of our food and fiber system. A conscious effort has been made to develop materials that were active in nature. The old adage: "Tell me, I'll forget; show me, I may remember; but, involve me, and I'll understand" has been our philosophy in developing these materials.

As you no doubt have already noticed, the materials are color coded. All teacher materials and answer keys are color-coded as follows:

pink.....Language Arts
yellow.....Mathematics
green.....Science
blue.....Social Studies
(student materials are white to eliminate problems in copying)

In the top, right-hand corner of each page is the major concept covered by that activity. Other concepts are indicated on the Teacher Material pages. The Langugage Arts materials also indicate which syllabus (of the five) was used. At the time this work was done, some of the syllabi were under revision. If this was the case, either the old syllabus or the draft of the new one was used. Adjustments will have to be made after the revised syllabus is made available.

It is crucial for you to understand that these materials are not intended to add to the curriculum. They simply offer a way to meet the concepts in the syllabus.

Thank you. Good luck with your efforts. I hope that you find these materials useful and enjoyable.

Sincerely,

Betty Wolanyk

Betty Wolanyk
Extension Associate

ss

NEW YORK AGRICULTURE IN THE CLASSROOM
GRADE 4

by
Betty Wolanyk

DEDICATION: To the memory of Patricia M. Brown, for her dedication to education and agriculture. Her contribution in developing the New York Agricultural Awareness curriculum forms the core of this project. We did it Pat!

Thanks to the following for their contributions:

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Maryann Cross
Alison DeMaree
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Mike Weaver
United States Department of Agriculture

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The program is administered by Cornell Cooperative Extension through the College of Agriculture and Life Sciences, Department of Education and the 4-H Youth Development program.

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RESOURCES

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TEACHER MATERIALS

CONCEPT: Reading - vocabulary

OBJECTIVE: The students will become familiar with agricultural terminology.

BACKGROUND: Throughout most of human history, the total population was responsible for the production and processing of food and fiber. Today, in the United States, less than 3% of our population is farming. Another 21% is directly employed in the rest of the food and fiber system. As a result of the move away from the land, terms which were once a common part of everyone's language are no longer used or understood by the general population.

The words used in these exercises form a vocabulary list for this book. The activities become progressively more difficult.

ACTIVITIES:

1. Have the students complete the Word Find exercises.

2. Have the students define the words using a dictionary. After defining the words, the students should be able to use the words in a sentence.

3. Add the words to spelling lists.

4. Have the students complete *"Find the Mystery Word"*. This should be completed <u>after</u> most of the other materials in the book are used. <u>New York is Growing</u> may be helpful in completing this activity.

VOCABULARY

Research
Livestock
Fishing
Seafood
Racing
Processing
Crops
Fleece
Fur
Blossom
Production
Equipment
Tractor
Soybeans
Pasture
Nitrogen
Legumes
Combine
Medicines
Markets
Preserve
Poison

Predator
Harmful
Rodents
Influence
Rancher
Breed
Knowledge
Retailing
Distribution
Cooperative
Nursery
Poultry
Heifer
Prey
Sheaves
Energy
Blueberries
Managing
Distance
Flavor
Disinfect

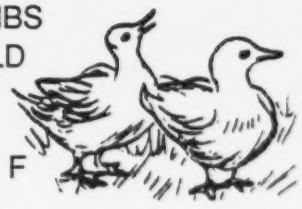
Evergreen
Table grapes
Geraniums
Strawberries
Florist
Maple syrup
Soil
Lillies
Lawns
Litter

Name _____ Date _____

WORD SEARCH

Search for and circle the following words. The words might be spelled forward, backward, top to bottom, or slanting.

BEEF	OATS	BULL	BUTTER
SOIL	PASTURE	FOAL	GOAT
PIG	SOYBEANS	DUCKS	FARM
COW	PLOW	BARN	LAMBS
LARD	HAY	MEAT	FIELD



A S T A O F A R M C F J B F

L I L N S C J V W H A Y M I

A I R B O O H Q O I O R P E

R Q O W F R D E L C F O A L

D U T S K N G I P K V M S D

R Y C M L P R R W E X E T W

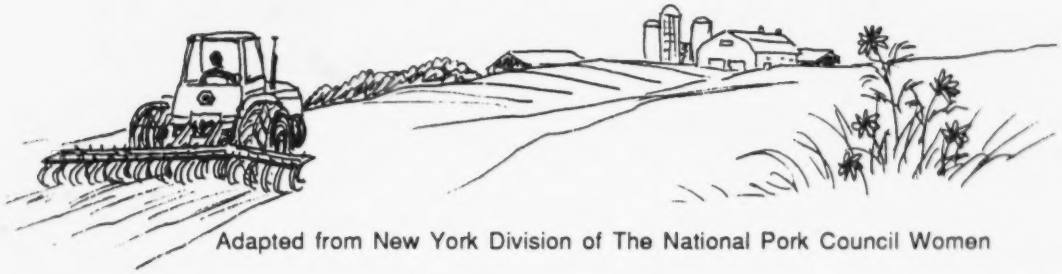
E Z A C A L F A A N A A U B

T T R B M F G H B D O T R F

T L T E B A U X T G S P E N

U H C I S S K C U D K E G D

B C S O Y B E A N S B U L L



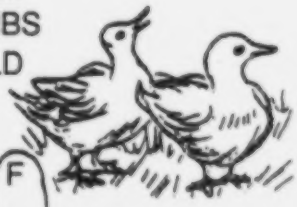
Adapted from New York Division of The National Pork Council Women

Name ***ANSWER KEY*** Date_____

WORD SEARCH

Search for and circle the following words. The words might be spelled forward, backward, top to bottom, or slanting.

BEEF	OATS	BULL	BUTTER
SOIL	PASTURE	FOAL	GOAT
PIG	SOYBEANS	DUCKS	FARM
COW	PLOW	BARN	LAMBS
LARD	HAY	MEAT	FIELD



A	S	T	A	O	F	A	R	M	C	F	J	B	F
L	I	L	N	S	C	J	V	W	H	A	Y	M	I
A	I	R	B	O	O	H	Q	O	I	O	R	P	E
R	Q	O	W	F	R	D	E	L	C	F	O	A	L
D	U	T	S	K	N	G	I	P	K	V	M	S	D
R	Y	C	M	L	P	R	R	W	E	X	E	T	W
E	Z	A	C	A	L	F	A	A	N	A	A	U	B
T	T	R	B	M	F	G	H	B	D	O	T	R	F
T	L	T	E	B	A	U	X	T	G	S	P	E	N
U	H	C	I	S	S	K	C	U	D	K	E	G	D
B	C	S	O	Y	B	E	A	N	S	B	U	L	L

Adapted from New York Division of The National Pork Council Women

Name _____ Date_____

AGRICULTURAL WORD FIND

Find these words in the puzzle. They can be up, down, diagonally forward or backward, or overlapped.

JAM	FLORIST	HORSES	SOD
TABLE GRAPES	CIDER	LAND	EEL
SEEDS	SOW	HONEY	LILLIES
TREE	COW	MILK	LAWNS
EVERGREEN	PLOW	BEE	BARN
GERANIUMS	WEED	MAPLE SYRUP	BIRD
STRAWBERRIES	EGG	ACRE	HAY
SOIL	LEAF		

R A E P G Z T E P W W A R P S P U L P E
T A B L E G R A P E S Z L E S L E A F V
R Z E J R D A C L E O O I E E C A R T E
E K G A A O W H E D W R I R M N R N I R
E L G M N S Z E S O R R A A R E H T D G
L I L L I E S S C E E M P A Z B T O N R
A M R H U B A R B S I L B I F E U E U E
W G E O M E Z W R A E R L A S O E L S E
N E D N S E A U A S L I R N P R R D B N
S V I E Z R N C Y T T E I E G H E E Z Z
O I C Y T C R R O R E O R R B E I Y S C
I N L S R E U P E Z P R E Z S P Z D S H
L E E O D P S F H E N V M H O R S E S A
D Y P E B U T T E R F L Y E E S E A Z Y
R A E E I C B E E F C A T T L E A T R E
I R F L O R I S T H Y D R I B O N I C S

Name *ANSWER KEY* Date_____

AGRICULTURAL WORD FIND

Find these words in the puzzle. They can be up, down, diagonally forward or backward, or overlapped.

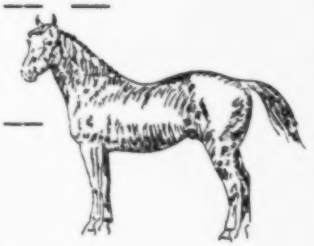
JAM
TABLE GRAPES
SEEDS
TREE
EVERGREEN
GERANIUMS
STRAWBERRIES
SOIL
FLORIST
CIDER
SOW
COW
PLOW
WEED
EGG
LEAF
HORSES
LAND
HONEY
MILK
BEE
MAPLE SYRUP
ACRE
SOD
EEL
LILLIES
LAWNS
BARN
BIRD
HAY

R	A	E	P	G	Z	T	E	P	W	W	A	R	P	S	P	U	L	P	E
T	A	B	L	E	G	R	A	P	E	S	Z	L	E	S	L	E	A	F	V
R	Z	E	J	R	D	A	C	L	E	O	O	I	E	E	C	A	R	T	E
E	K	G	A	A	O	W	H	E	D	W	R	I	R	M	N	R	N	I	R
E	L	G	M	N	S	Z	E	S	O	R	R	A	A	R	E	H	T	D	G
L	I	L	L	I	E	S	S	C	E	E	M	P	A	Z	B	T	O	N	R
A	M	R	H	U	B	A	R	B	S	I	L	B	I	F	E	U	E	U	E
W	G	E	O	M	E	Z	W	R	A	E	R	L	A	S	O	E	L	S	E
N	E	D	N	S	E	A	U	A	S	L	I	R	N	P	R	R	D	B	N
S	V	I	E	Z	R	N	C	Y	T	T	E	I	E	G	H	E	E	Z	Z
O	I	C	Y	T	C	R	R	O	R	E	O	R	R	B	E	I	Y	S	C
I	N	L	S	R	E	U	P	E	Z	P	R	E	Z	S	P	Z	D	S	H
L	E	E	O	D	P	S	F	H	E	N	V	M	H	O	R	S	E	S	A
D	Y	P	E	B	U	T	T	E	R	F	L	Y	E	E	S	E	A	Z	Y
R	A	E	E	I	C	B	E	E	F	C	A	T	T	L	E	A	T	R	E
I	R	F	L	O	R	I	S	T	H	Y	D	R	I	B	O	N	I	C	S

Vocabulary

Name_____Date_____

Fill in the blanks with the correct terms and find the mystery word.

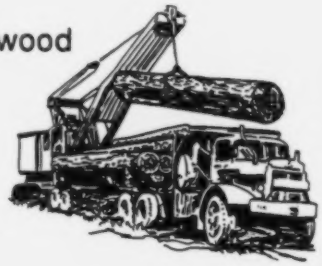


1. _ _ _

5. Plants that we grow in fields for food or feed are called _____.

6. Fleece and _____ are the outer coats of some animals which we use to make clothing.

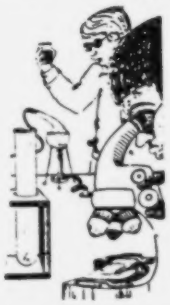
7. A plant's blossom is also called a _____.



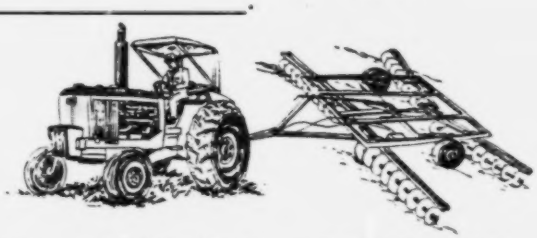
8. The plants we make into paper, furniture, firewood and lumber are called _____.

9. Raising animals or growing plants to produce food is called _____ agriculture.

10. Scientists discover or _____ new ways to produce, harvest, process and distribute food.



11. Machinery that farmers use to till, plant, and harvest crops is called _____.



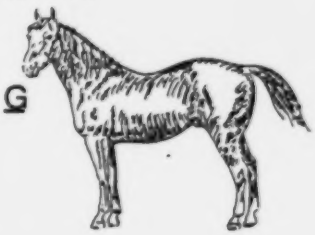
THE MYSTERY WORD:

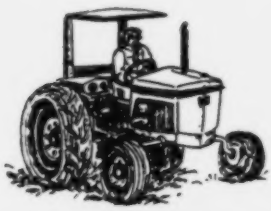
_____ is the production, processing, distribution, and marketing of food and fiber.

Name ***ANSWER KEY*** Date _____

Fill in the blanks with the correct terms and find the mystery word.

1. A N I M A L S
2. F I S H I N G
3. R A C I N G
4. P R O C E S S I N G
5. C R O P S
6. E U R
7. F L O W E R
8. T R E E S
9. P R O D U C T I O N
10. R E S E A R C H
11. E Q U I P M E N T





1. Livestock provides man with meat, milk, eggs, and transportation. Livestock are not plants but _____.

2. Fish and seafood are caught or trapped by men and women from _____ boats.

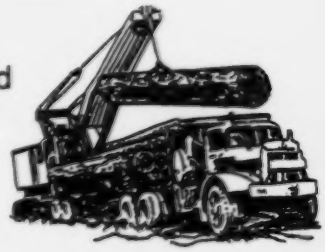
3. The sport where horses run around a track to see which one is the fastest is called _____.

4. Changing apples to applesauce, hides to leather, fleece to wool, and trees into furniture is known as _____.

5. Plants that we grow in fields for food or feed are called _____.

6. Fleece and _____ are the outer coats of some animals which we use to make clothing.

7. A plant's blossom is also called a _____.



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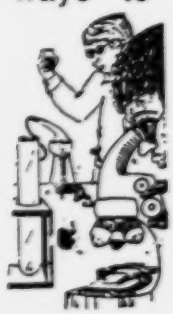
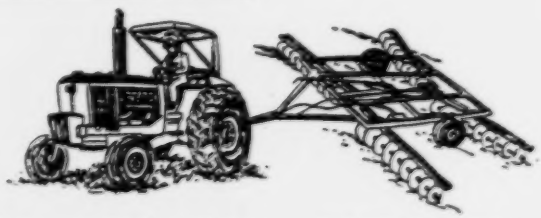
9. Raising animals or growing plants to produce food is called _____ agriculture.

10. Scientists discover or _____ new ways to produce, harvest, process and distribute food.



11. Machinery that farmers use to till, plant, and harvest crops is called _____.



THE MYSTERY WORD:

AGRICULTURE is the production, processing, distribution, and marketing of food and fiber.

TEACHER MATERIALS

CONCEPT: Listening and Speaking - predicting

Life Science - II A 1.23 - Seeds are found in fruits

OBJECTIVE: The student will listen attentively to the story *No Doors, No Windows, A Star Inside* and try to predict the outcome.

BACKGROUND: The apple is a very complex entity as are most of the agricultural products produced in New York. The story, *No Doors, No Windows, A Star Inside,* explains some of that complexity. At the same time, it allows the students to think creatively to solve the puzzle. Develop the concept of the apple as a house and explain how it shelters the seeds inside.

ACTIVITIES:

1. Ask the students to bring an apple to school.

2. Prepare to cut an apple horizontally to show the star.

3. Read the story, *No Doors, No Windows, A Star Inside.* If you like, insert the name of your town at the beginning of the story.

4. Just before the end of the story, allow the students to guess where the star is. Most often we cut apples vertically. The trick here is to cut the apple horizontally or crosswise. Cut the apple and show the students the star.

5. Discuss why the apple can be compared to a house. (It houses the seed, protects it, the fruit rots and helps provide a seed

bed, etc.).

6. Have the students tell their parents the story and ask them to cut an apple crosswise.

7. Tie the story to the science concept of fruit containing seeds.

8. On page 11 of *New York is Growing*, you will note that New York ranks second in the production of apples. Discuss this with the class.

9. Conduct the Social Studies lesson on *"Apple Sauce"* (pages 10-11 in New York is Growing and pages 129-134 in the Teacher Notebook) in conjunction with this lesson.

"NO DOORS, NO WINDOWS, A STAR INSIDE"

Once upon a time, in a far away town, just about the size of Plattsburgh, there lived a little boy very much like one you know.

One day, when he had thought of all the games he could play, played all the games he could think of, and had watched all the television he cared to, he went to his mother, who was very wise, and knew all about what little boys like to do, and he said,

"Mother, what can I do?"

His mother thought for a minute or two, then said, "I know of a little red house with no doors, no windows, and a star inside. Do you think you can go on an adventure to find it, and still be back in time for supper?"

"Oh, yes!" exclaimed the little boy happily, and off he went.

First he went to his grandmother's house at the top of the hill. He found her making gingerbread cookies in her big, warm kitchen. As he was finishing his second cookie, he asked her about the little red house with no doors, no windows and a star inside.

She shook her head and said, "No, I don't believe I know of a house like that. Why don't you ask the wind? The wind goes everywhere. I'm sure he can help."

So the little boy went outside to ask the wind about the little red house with no doors, no windows, and a star inside.

And the wind said, "Ooooo, oooo-oooo!"

It sounded to the little boy as if he was saying "Come with me!" So the little boy ran after the wind.

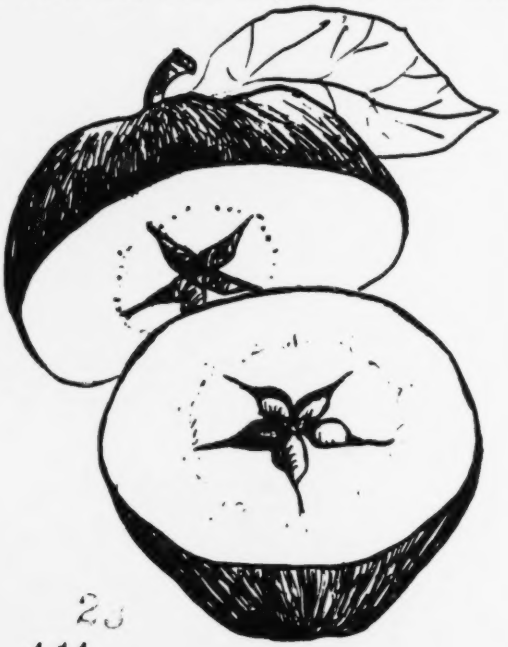
He ran through the grass, over the hill, and into the orchard. And there, on the ground, under an apple tree, was a little red house! A little red house with no doors, no windows.

But where was the star? He picked it up, and it filled up his hands. He ran home to Mother.

"Look, Mother! I found the little red house with no doors, no windows. But where is the star inside?"

Mother cut the apple in half. Now the little boy could see the star inside.

Can you see it?



TEACHER MATERIALS

CONCEPT:

Composition - to express self
- grammar

Reading - vocabulary

Art

OBJECTIVES:

1. The students will use haiku as a form of expression for appreciation of nature.

2. The students will develop skills in observation and imagery.

3. The students will divide words into syllables.

BACKGROUND: An appreciation of the natural world is important in our self-fulfillment as well as in making decisions regarding the management of our resources. Developing the skills of keen observation and sensory awareness are well integrated with feelings of appreciation and wonder in this lesson on haiku.

ACTIVITIES:

1. Have the students complete the worksheet on syllables to make sure that they understand syllables.

2. Have the students read "Drawing Word Pictures." Allow students an opportunity to talk about scenes or experiences in nature which have been especially meaningful to them.

   a. Read the haiku, allowing time to develop a sense of the scenes represented in the haiku.

b. If possible, go outdoors to an area where the students can observe and enjoy nature. This can be done in conjunction with the science lesson on wildlife.

c. Allow a quiet time for the students to close their eyes, relax, and visualize a scene from nature. Encourage vivid visualization of details.

d. If students have trouble visualizing a nature scene, have them close their eyes while you "guide" their visualization of a walk through the park or through the woods.

e. Encourage the students to pay attention to the way they feel as they are experiencing nature, either directly or in their imaginations.

3. Have the students write their own haiku, drawing upon their sensory experiences and their feelings.

4. The finished haiku may be illustrated and displayed on the bulletin board.

5. If the students have difficulty, do this exercise as a class project.

6. In conjunction with this lesson, complete the science lesson on wildlife.

Vocabulary

Name_____Date_____

Directions: After each word listed below divide the word into syllables then write the number of syllables in each word.

1. windy _____ _____
2. delicate _____ _____
3. icy _____ _____
4. flower _____ _____
5. snowflake _____ _____
6. velvet _____ _____
7. quietly _____ _____
8. flutter _____ _____
9. scent _____ _____
10. butterfly _____ _____

Composition
- to express self
- to describe

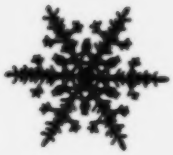
THE NATURE AROUND US

Nature is all around us. The breeze on a spring day or the gentle touch of a cold snowflake reminds us. Nature often springs a surprise when least expected. A sudden thunderstorm in the summer, a flaming red sky at sunset and the color of leaves in the fall visit no matter where one lives.

Expressing how we feel is often difficult. One way to express feelings is with poetry. Poetry can be very simple and still be beautiful. A simple poetry is haiku.

Haiku is a type of Japanese poetry. It describes things in nature. A haiku should have three lines and seventeen syllables. Don't be concerned about actually having the number of syllables perfect the first time you write a haiku. It is more important to express your feelings. The ability to describe nature and how you feel about it is today's goal.

Read these haiku and imagine nature.



Snowflakes

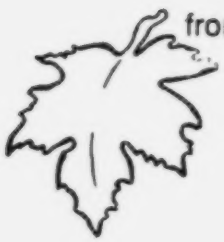
Frosty snowflakes drift.
I taste the perfect winter melting on my lips.

Chvonne Arline

Leaves

They drift through the air,
from left to right, up and down.
Then they hit the ground.

Dru Walters



Walk outside. What do you see? Smell? Feel? Are there birds? Is it windy? Is it cloudy? Look at the little things; a puddle, small insects, or blades of grass. What does the sun feel like?

If you can't go outside, remember a day you really liked. Close your eyes. What were the sights, sounds and smells? Remember how you felt.

Now, write a haiku of your own special feelings. Draw a picture to go with it.

TEACHER MATERIALS

CONCEPT: Composition - to persuade
Art

OBJECTIVE: The student will create an advertisement or commercial about one of the commodities (or products made from the commodity) listed in the top 10 for New York production.

BACKGROUND: Many of the foods and fibers produced in New York, as well as the United States, impact on our economy. Some of the largest advertising firms in the country are located in New York State. Advertising has a tremendous impact on the lives of each of us. The students should learn about that impact both as a positive and as a negative force. Have them ensure that the products are represented accurately and that they do not reinforce stereotypes.

ACTIVITIES:

1a. The student will select one of the commodities, i.e., apples listed in the top 10 for New York production in *New York is Growing* on page 7 and write an advertisement or design a commercial.

b. The student will select a product made from a top 10 commodity, spaghetti sauce, and design a commercial/ advertisement.

2. Have the students illustrate their work.

3. Make a collage of New York products cut from magazines.

4 Make sure the students identify that the product was made with a commodity grown in New York.

NEW YORK RANKS

First -	Cabbage for Sauerkraut
	Cottage Cheese
Second -	Maple syrup
	Corn for silage
	Beets for processing
	Grapes
	Sweet Corn
	Apples
Third -	Tart Cherries
	Milk and Dairy Products
	Snap Beans
	Fresh Cabbage
Fourth -	Pears
	Cauliflower
	Hay (other than Alfalfa)
Fifth -	Lettuce
	Veal
	Celery
	Green Peas for Processing
Sixth -	Greenhouse and Nursery Crops
	Onions
Seventh-	Carrots
Tenth -	Tomatoes
	Oats
	Dry Beans
	Rye

TEACHER MATERIALS

CONCEPTS:

Composition		- to explain
Life Science	II A - 2.2	- plant and animal needs
	II B - 1	- environment
	I A - 1, 2	

OBJECTIVE: The students will develop library skills, research a subject and write a one-page report.

BACKGROUND: New York State, as many others, has designated certain plants, animals and minerals as the official state symbols. Students should recognize that these symbols have special meaning for our state and, in some cases, that conservation efforts are needed to maintain the environment for these plants and animals. In participating in this activity, the students will gain an appreciation for the plant and animal needs.

ACTIVITY: In the booklet, *New York is Growing,* on pages 30 and 31 is a listing of New York State's plant and animal symbols. Have the students select one of these symbols, research it, and write a one-page report. Have students pay special attention to why their symbol was chosen for New York.

The New York State Mammal is:

***The Beaver.**

TEACHER MATERIALS

CONCEPTS:

Composition - to explain
Social Studies - change (social p. 48)
(economic p. 52)
- culture (social pp. 48,50)
- interdependence
(economic pp. 54, 56)

OBJECTIVE: The student will organize the information and write a one page report.

BACKGROUND: Oftentimes, the accomplishments of famous people are taken for granted. Many small events, innovations, and inventions have led us to today. The accompanying list of New Yorkers should give the students a flavor for those changes.

ACTIVITIES:

1. Make copies of the pages of *New Yorkers Important in Agricultural History*.
2. Have each student select an individual from the list who interests him or her.
3. Have each student organize the information into a one page report in their own words.
4. Have the students illustrate their work.
5. Coordinate this activity with the technology timeline in Social Studies.
6. Make use of the poster in the resource section - "The First Tile Drainage" .

Note - U.S.D.A stands for United States Department of Agriculture

NEW YORKERS IMPORTANT IN AGRICULTURAL HISTORY

Cleveland Abbe..... **Born** - 1838
Birthplace - New York City
Died - 1916
Famous as - First Official U.S. weather forecaster

1869 - As director of the Cincinnati Observatory, he began to predict storms.

1870 - When the U.S. weather service was begun, he was the only man in the U.S. who could draw weather maps.

1871 - He was put in charge of the weather predicting efforts of the U.S. Army Signal Corps.

1891 - Congress turned the job of predicting weather over to the U.S.D.A.

Henry Cullen Adams ..... **Born** - 1850
Birthplace - Oneida County, N.Y.
Died - 1906
Famous for - While he served in Congress (representing Wisconsin), his bills were passed for:
* meat inspection
* Arizona statehood
* New Mexico statehood
* increased funding for experimental stations.

John F. Appleby ..... **Born** - 1840
Birthplace - Oneida County, N.Y.
Died - 1917
Famous for - He invented a machine which tied bundles of grain into sheaves.

1879 - He patented a twine knotter which would be used on all grain binders. Before this invention, grain

harvesting was slow and tedious. The stalks of grain would be cut (by a reaper). They would be gathered into bundles and hand tied into sheaves. Then sheaves would be carried to the thresher to separate the grain from the stalks. Automatic tying saved time and hard work.

Wilbur O. Atwater ..... **Born** - 1844
Birthplace - Johnsville, N.Y.
Died - 1907
Famous for - Calories

He developed a way to measure how much energy was in food. He is sometimes called the inventor of calories. He also proved that some plants (known as legumes) could take nitrogen from the air and leave it in the soil. This is known as nitrogen fixation. He was a Methodist Minister. He was one of agriculture's greatest scientists. His research was the foundation for the study of human and animal nutrition.

1887-1891- First U.S.D.A. director of The Office of Experimental Stations.

Howard Edward Babcock .... **Born** - 1889
Birthplace - Gilbertsville, N.Y.
Died - 1950
Famous for - Founding GLF

1918 - GLF was a cooperative of the Grange - League - Federation. It is known today as Agway.

1922-32 - As General Manager of GLF, he was widely respected. He also owned a 1,000 acre poultry and livestock farm near Ithaca, N.Y. .

Willis Haviland Carrier..... **Born** - 1876
Birthplace - Angola, N.Y.
Died - 1950
Famous as - the Father of Air Conditioning

1911 - He presented a paper of theory and practical facts which was the founding of air conditioning and refrigeration.

He graduated from Cornell University. He would go on to head the Carrier Corporation.

Jerome Increase Case ..... **Born** - 1818
Birthplace - Williamstown, N.Y.
Died - 1892
Famous For - Invented the first combine

1842 - He "combined" the work of the threshing machine and separator into one machine. This machine became known as a combine.

1857 - He was making and selling 1,600 combines per year. He later expanded to manufacture and sell plows, tractors and other farm machines. J.I. Case, Co. became one of the largest agricultural equipment manufacturers in the world.

Vernon Frederick Coville... **Born** - 1867
Birthplace - Preston, N.Y.
Died - 1937
Famous for - The blueberry

Elizabeth White of New Jersey began to improve the wild blueberry in New Jersey. She asked Dr. Coville for help. Dr. Coville was then a scientist in plant breeding working, for the U.S.D.A. Together they developed the wild blueberry into the fruit we know. Today, more than 20,000 acres of blueberries are grown in the U.S.

Howard D. Doane ..... **Born** - 1883
Birthplace - Mexico, N.Y.
Died - unknown
Famous for - Doane Agricultural Service

1919 - He organized the Doane Agricultural Service for

managing farms. It is still in existence today as one of the largest farm management service organizations.

1929 - He founded the American Society of Farm Managers and Rural Appraisers.

It is said he was one of the most creative agriculturists in the 20th century.

Albert Kenrick Fisher ..... **Born** - 1856
Birthplace - Ossining, N.Y.
Died - 1948
Famous for - "Hawks and Owls of the United States", a bulletin published in 1893

He proved that predatory birds were not generally harmful to poultry and game birds. But rather, by eating rodents, were quite useful to farmers. As a direct result, most states repealed their laws offering bounties on predatory birds such as hawks and owls. Farmers gradually learned not to shoot these friends.

He did this by dissecting 2,690 birds of prey. By looking at what was in their stomachs he proved that only 3 out of 73 species of birds would eat poultry or game birds.

Charles Josiah Galpin ..... **Born** - 1864
Birthplace - Hamilton, N.Y.
Died - unknown
Famous as - the Father of Rural Sociology

While working for the U.S.D.A., he wrote four books that began the study of rural life. He was decorated by the King of Belgium.

William Hoard..... **Born** - 1836
Birthplace - Munnsville, N.Y.
Died - 1918
Famous for - Founding the Hoard's Dairyman

1885 - He created a magazine titled Hoard's Dairyman which is still popular today. This magazine had nationwide influence on the dairy industry. It helped improve both dairy cattle and dairy products.

His most famous quote is "The dairy cow is the foster mother of the human race".

Richard King ..... **Born** - 1825
Birthplace - New York City, N.Y.
Died - 1885
Famous for - The King Ranch

1852 - Riverboat Captain Richard King bought 75,000 acres of land south of Corpus Christi, Texas.

1855 - The Kings owned one half million acres of land.

The King Ranch is the largest ranch in the world today. It is nearly one million acres in size.

The only new breed of cattle of America was developed by the King family. The Santa Gertrudis are a combination of Shorthorn and Brahma Cattle. The Shorthorn breed is known for good beef. The Brahma is known to resist heat and insects. By crossing these two breeds a good quality beef breed able to hold up under hot humid conditions was born.

1875 - King was the first rancher to market Texas Longhorn Cattle. Four herds of 1,000 head of cattle were driven from South Texas to the rail line at Denison (North Texas).

Seaman A. Knapp .....

Born - 1833
Birthplace - Schroon Lake, N.Y.
Died - 1911
Famous for - Cooperative Extension

1884 - He became the president of Iowa State College.

1886 - He resigned from Iowa State College to promote the colonizing of Louisiana. He helped to develop the Louisiana rice industry. To get the best rice varieties and knowledge about processing, he made two trips to the Orient.

1903 - He moved to Texas as a special agent of the U.S.D.A.. The boll weevil was ruining Texas cotton crops. Farmers raising cotton were losing their farms. Knapp brought knowledge from government scientists to help farmers. The U.S.D.A. scientist's recommendations were not difficult but farmers resisted the ideas. Knapp convinced one large farmer to try their methods. It worked! The farmer told everyone. This was the beginning of the county agent system known as Cooperative Extension.

Robert Livingston .....

Born - 1746
Birthplace - New York City
Died - 1813
Famous for - Declaration of Independence

1776 - He helped to draft the Declaration of Independence but was unable to vote for it or sign it. He was absent at the time.

1789 - As New York's Chancellor, he administered the oath of office to George Washington.

He was one of the negotiators of the Louisiana Purchase.

In partnership with Robert Fulton, he helped to

pioneer the use of Steamboats.

As minister to France and a friend of Napoleon, he brought French Merino sheep to the U.S. (The sheep came from the Spanish merino sheep. These were a good wool breed).

William J. Morse ..... **Born** - 1884
Birthplace - Lowville, N.Y.
Died - 1959
Famous for - Soybeans

Morse promoted soybeans. He wrote articles and bulletins. He gave speeches and visited farmers to convince the U.S. to grow soybeans. He travelled through the orient (China, Manchuria, Korea and Japan) to gather soybeans. He brought back 5,000 samples of soybeans. All together he brought 2,000 varieties of seed to the U.S. from this trip. Later, when he worked for the U.S.D.A. , he doubled those numbers. From these seeds today soybeans have been developed.

Today, soybeans are a major U.S. crop. They are used in livestock feed. They are crushed for oil. Soybeans are made into tofu, soymilk (for infants) and soysauce.

Sterling J. Morton ..... **Born** - 1832
Birthplace - Adams, N.Y.
Died - 1902
Famous for - Arbor Day.

1893 - He served as the third Secretary of Agriculture until 1897.

1872 - He settled in Nebraska and planted many trees on his farm. His effort to encourage other farmers to plant trees led to Arbor Day. The Nebraska State Board of Agriculture founded Arbor Day on Morton's birthday, April 10. It was his motion to do so. The Legislature later changed the date to April 22.

George Harold Powell ..... **Born** - 1874
Birthplace - Ghent, N.Y.
Died - 1922
Famous for - Sunkist, Inc.

1911 - He was one of the leaders in founding the California Fruit Growers Exchange. Today this cooperative is called Sunkist, Inc.. It was his leadership which helped Sunkist through the early stages of formation. Today, Sunkist, Inc. is a success.

1913 - He wrote Cooperation in Agriculture.

1917 - He was the head of the perishable foods division of the U.S. Food Administration for two years.

William Prince ..... **Born** - 1725
Birthplace- Flushing, Long Island
Died - 1802
Famous for - One of the first Nurseries in the United States

William Prince began a dynasty of Princes involved in the nursery business. His nursery on Long Island is believed to be one of the first commercial nurseries in the U.S. He practiced budding and grafting to develop new trees. The Gage plum was one of his developments. He grew many kinds of fruits, trees, and shrubs. Several thousand of his young cherry trees were cut down and made into barrel hoops during the American Revolution.

William Prince II ..... **Born** - 1766
Birthplace - Flushing, Long Island
Died - 1842
Famous for - Bartlett Pears

The son of William Prince continued the nursery business. He imported and exported plants and trees from their Long Island nurseries. One of his imports was a pear which he named the Bartlett

pear.

He brought a new grape to the new world and named it the Isabella. For half a century it was an American favorite.

William Robert Prince ..... **Born** - 1795
Birthplace - Flushing, Long Island
Died - 1869
Famous for - Silk

The third William Prince in the nursery business was known for trying to establish the silk culture in New York. Unfortunately, trying to encourage mulberries and silk worms cost him his fortune. It also may have cost the family business. Later in the 1850's, he passed the nurseries to his sons. Early in the civil war the business left family control.

James E. Rice ..... **Born** - 1865
Birthplace - New York State
Died - 1953
Famous as - The father of American poultry

1908 - He organized and led the Poultry Science Association.

1918 - He founded the first poultry judging school.

1939 - He served as the general chairman of the World Poultry Congress in Cleveland.

He also began the first poultry extension work, headed the Cornell Poultry Department and has a building named after him at Cornell University.

TEACHER MATERIALS

CONCEPTS: Mathematics
- cardinal numbers
- rounding
- large numbers
- place value
- addition
- subtraction
- multiplication
- word problems
- division

OBJECTIVE: The students will follow directions, perform the computations, read and compare information.

BACKGROUND: Agriculture in New York State is very big business and very complex. These worksheets will utilize some of the data concerning agriculture as a huge industry and some of the specific information of the fruit, vegetable, and livestock industries.

ACTIVITIES: The worksheets are arranged by difficulty in order to follow the progress a child will make through the year. They are all word problems.

Worksheet 1: "New York Agriculture"
- cardinal numbers
- large numbers
- addition
- subtraction

Worksheet 2: "Melanie and Bob"
- addition

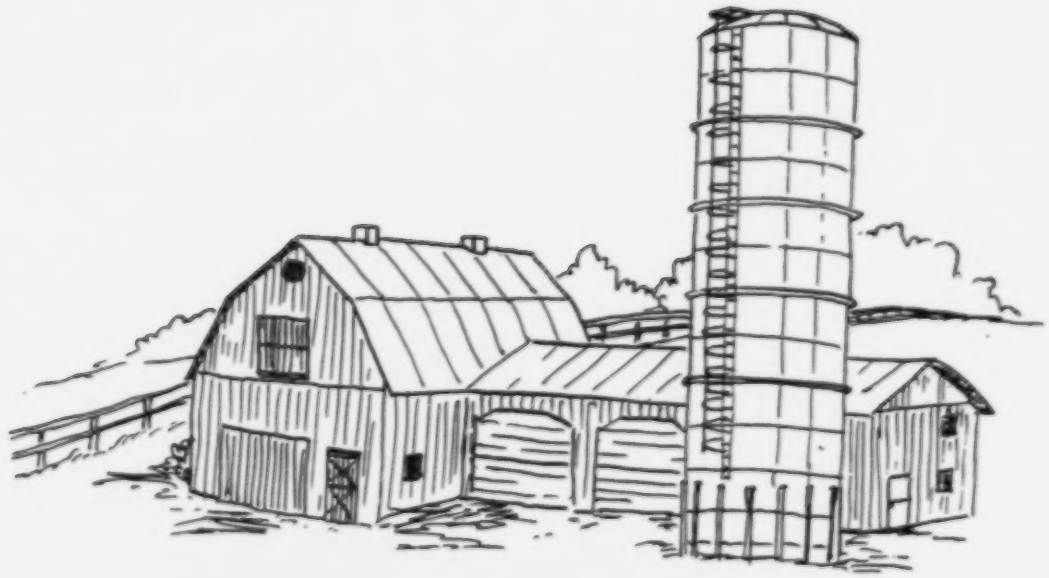
Worksheet 3: "Long Island Agriculture"
- subtraction
- rounding
- multiplication

Worksheet 4: "Fruit Production"
- multiplication

Worksheet 5: "Livestock Production"
- multiplication
- addition
- subtraction

Worksheet 6: "Animal Stomachs"
- measurement
- multiplication
- division

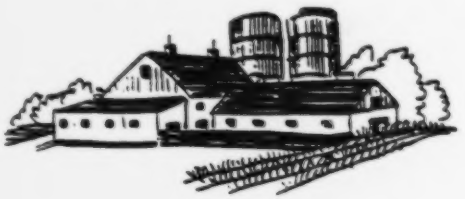
Worksheet 7: "Wheat"
- subtraction
- multiplication



Name _____ Date _____

NEW YORK AGRICULTURE

1. New York has forty-two thousand farms. Write this number on the first line. Two thousand, five hundred of them are operated by women alone. Write this number on the second line. How many are operated by men or couples?



_____

_

_____

_____ farms operated by men or couples

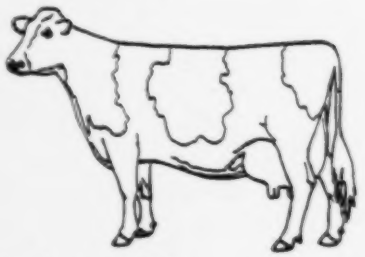
2. New York has one million dairy and beef cattle. New York also has eight million, five hundred thousand chickens, one hundred thousand swine and sixty-seven thousand sheep. Write the numbers for those livestock and add them up.

_____ dairy and beef cattle

_____ chickens

_____ swine

\+ _____ sheep



_____ total livestock in N.Y.

3. Write in words, the number of livestock in New York.

_____

_____

4. More than three hundred and ten million pounds of grapes are produced in New York each year. Write the numeral for this figure.

_____ pounds of grapes

5. $13,300,000 worth of cut flowers and greens are produced in New York's greenhouses every year. Write in words the number $13,300,000.

_____

_____

6. The average cow produces thirty thousand glasses of milk in one year. In ten years she will produce 300,000 glasses. Write the words for that many glasses of milk.

_____

_____

Name *ANSWER KEY* Date _____

NEW YORK AGRICULTURE

1. New York has forty-two thousand farms. Write this number on the first line. Two thousand, five hundred of them are operated by women alone. Write this number on the second line. How many are operated by men or couples?

42,000

\- 2,500

39,500 farms operated by men or couples

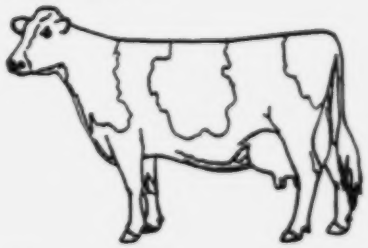
2. New York has one million dairy and beef cattle. New York also has eight million, five hundred thousand chickens, one hundred thousand swine and sixty-seven thousand sheep. Write the numbers for those livestock and add them up.

1,000,000 dairy and beef cattle

8,500,000 chickens

100,000 swine

\+ 67,000 sheep



9,667,000 total livestock in N.Y.

3. Write in words, the number of livestock in New York.

nine million, six hundred sixty-seven thousand

4. More than three hundred and ten million pounds of grapes are produced in New York each year. Write the numeral for this figure.

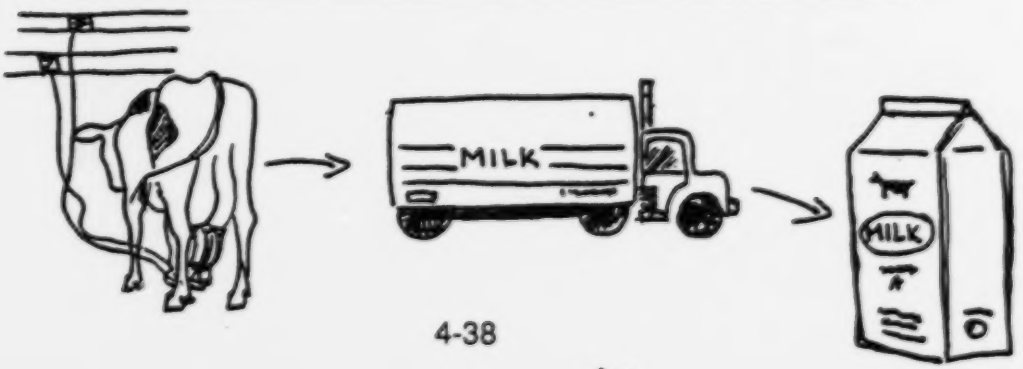
310,000,000 pounds of grapes.

5. $13,300,000 worth of cut flowers and greens are produced in New York's greenhouses every year. Write in words the number $13,300,000.

thirteen million, three hundred thousand

6. The average cow produces thirty thousand glasses of milk in one year. In ten years she will produce 300,000 glasses. Write the words for that many glasses of milk.

three hundred thousand



Word Problems
- **addition**
- **subtraction**
- **rounding**

Name _____Date_____

MELANIE AND BOB

Melanie and Bob are brother and sister. They are each raising a dairy calf. A young female calf is called a heifer. After the heifers grow up, Melanie and Bob plan to sell them to another farmer and make a profit. Add up what it costs them to raise these heifers.

Melanie

3 day old calf	$100.00
hay	$120.00
salt	$ 1.00
corn	$ 25.00
barley	$200.00
beet pulp	$ 10.00
medicine	$ 12.00
minerals	$ .75
equipment	$ 60.00
housing	$ 10.00

Bob

3 day old calf	$120.00
hay	$115.00
salt with minerals	$ 1.50
corn	$ 30.00
soybean meal	$220.00
equipment	$ 43.00
vet bill	$ 46.00
housing	$ 10.00

Word Problems
- **addition**
- **subtraction**
- **rounding**
- **multiplication**

Name: _____Date_____

1. How much did it cost Melanie to raise her heifer?

_____

2. How much did it cost Bob to raise his heifer?

_____

3. If Melanie sold her heifer for $700 how much money did she make?

_____

4. If Bob sold his heifer for $725.00, how much money did he make?

_____

5. Who made the most money, Bob or Melanie?

_____

6. Bob and Melanie decided that it would not take much more work to raise five heifers each. How much profit do they plan to make next year? (Round the profit to the nearest whole number before multiplying.)

Melanie _____ Bob _____

Word Problems
- **addition**
- **subtraction**
- **rounding**
- **multiplication**

Name: ***ANSWER KEY*** Date _____

MELANIE AND BOB

1. How much did it cost Melanie to raise her heifer?

$538.75

2. How much did it cost Bob to raise his heifer?

$585.50

3. If Melanie sold her heifer for $700 how much money did she make?

$161.25

4. If Bob sold his heifer for $725.00 how much money did he make?

$139.50

5. Who made the most money, Bob or Melanie?

MELANIE

6. Bob and Melanie decided that it would not take much more work to raise five heifers each. How much profit do they plan to make next year? (Round the profit to the nearest whole number before multiplying.)

Melanie **161 X 5 = 805.00** Bob **140.00 X 5 = 700.00**

Name: _____ Date_____

LONG ISLAND AGRICULTURE

Long Island agriculture is a thriving enterprise. Today Suffolk County leads New York State in agricultural production.

On Long Island there are:

1. 13,000 acres of potatoes
   55,000 acres of grain
   4,500 acres of nursery stock
   35,000 acres of sod

   How many total acres are planted with these products?

   _____ acres

2. 2,000 acres of cauliflower
   1,700 acres of cabbage
   1,200 acres of sweet corn
   500 acres of string beans

   How many total acres are planted with these crops?

   _____ acres

3. 1,000 acres of grapes
   400 acres of peaches
   330 acres of apples
   300 acres of strawberries
   100 acres of melons

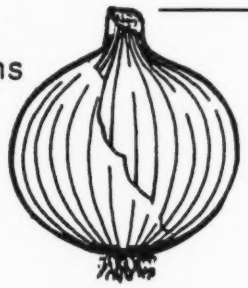
   How many total acres are planted with these crops?

   _____ acres

4. 300 acres of cucumbers
300 acres of peppers
300 acres of onions
300 acres of spinach
200 acres of lettuce
200 acres of squash
200 acres of pumpkins

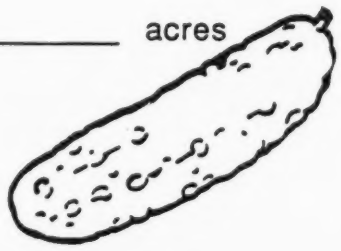
How many total acres are planted with these vegetables?

_____ acres

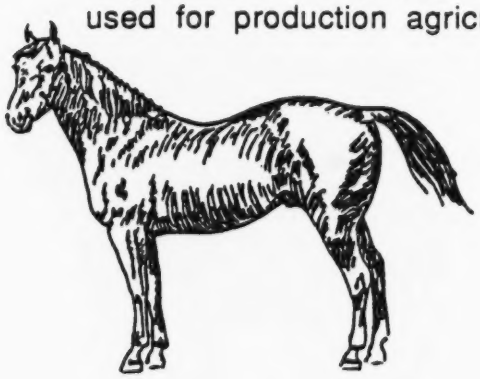


5. How many total acres are planted to crops, vegetables and nursery stock on Long Island? (Add the totals from problems 1, 2, 3, and 4.)

_____ acres



6. In addition to these products (in #5) there are 1,000 acres used to raise horses and 1,000 acres used for other crops. What is the total number of acres on Long Island used for production agriculture and nursery stock?

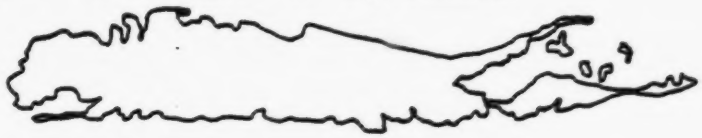


_____ acres

Name: ***ANSWER KEY*** Date_____

LONG ISLAND AGRICULTURE

Long Island agriculture is a thriving enterprise. Today Suffolk County leads New York State in agricultural production.



On Long Island there are:

1. 13,000 acres of potatoes
   55,000 acres of grain
   4,500 acres of nursery stock
   35,000 acres of sod

   How many total acres are planted with these products?

   107,500 acres

2. 2,000 acres of cauliflower
   1,700 acres of cabbage
   1,200 acres of sweet corn
   500 acres of string beans

   How many total acres are planted with these crops?

   5,400 acres

3. 1,000 acres of grapes
   400 acres of peaches
   330 acres of apples
   300 acres of strawberries
   100 acres of melons

   How many total acres are planted with these crops?

   2,130 acres

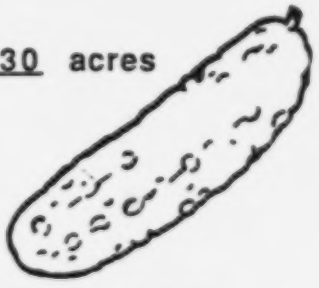
4. 300 acres of cucumbers
300 acres of peppers
300 acres of onions
300 acres of spinach
200 acres of lettuce
200 acres of squash
200 acres of pumpkins

How many total acres are planted with these vegetables?

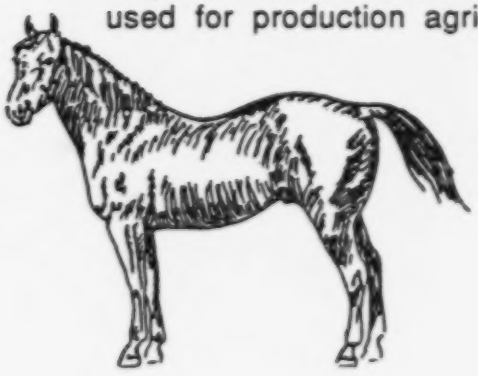
1,800 acres

5. How many total acres are planted to crops, vegetables and nursery stock on Long Island? (Add the totals from problems 1, 2, 3, and 4.)

116,830 acres



6. In addition to these products (in #5) there are 1,000 acres used to raise horses and 1,000 acres used for other crops. What is the total number of acres on Long Island used for production agriculture and nursery stock?



118,830 acres

Name: _____ Date _____

FRUIT PRODUCTION

DIRECTIONS: Complete the multiplication problems and show your work.

1. A dwarf apple tree grows to about 7 feet tall. It produces 2 bushels of apples per year. If 600 trees are planted on one acre of land, how many bushels of apples will be produced on that acre?

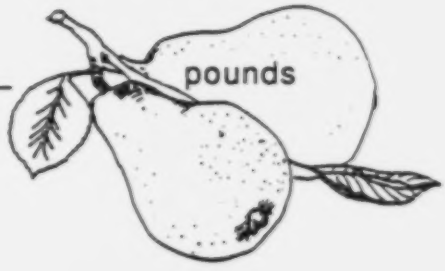
_____ bushels

2. A bushel of apples weighs 42 pounds. How many pounds of apples can one dwarf apple tree produce? (Use the facts from #1)

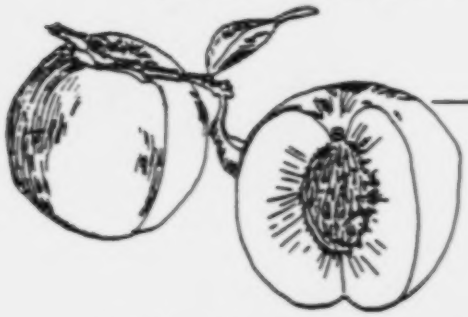
_____ pounds of apples

3. A bushel of pears weighs 50 pounds. If an acre of pears yields 400 bushels, how many pounds would this be?

_____ pounds



4. An acre of peaches can produce 300 bushels in New York State. One bushel of peaches weighs 48 pounds. How many pounds of peaches can be produced on one acre?



_____ pounds

5. A standard apple tree grows to be about 25 feet tall. Somewhere between 27 and 36 trees are normally planted on one acre. This type of orchard will produce 900 bushels of apples. (A bushel of apples weighs 42 pounds.) How many pounds is this?

_____ pounds

Name: ***ANSWER KEY*** Date _____

FRUIT PRODUCTION

DIRECTIONS: Complete the multiplication problems and show your work.

1. A dwarf apple tree grows to about 7 feet tall. It produces 2 bushels of apples per year. If 600 trees are planted on one acre of land, how many bushels of apples will be produced on that acre?

1,200 bushels.

2. A bushel of apples weighs 42 pounds. How many pounds of apples can one dwarf apple tree produce?

84 pounds of apples

3. A bushel of pears weighs 50 pounds. If an acre of pears yields 400 bushels, how many pounds would this be?

20,000 pounds

4. An acre of peaches can produce 300 bushels in New York State. One bushel of peaches weighs 48 pounds. How many pounds of peaches can be produced on one acre?

14,400 pounds

5. A standard apple tree grows to be about 25 feet tall. Somewhere between 27 and 36 trees are normally planted on one acre. This type of orchard will produce 900 bushels of apples. (A bushel of apples weighs 42 pounds.) How many pounds is this?

37,800 pounds.

Name _____ Date _____

LIVESTOCK PRODUCTION

1. A mother hog (called a sow) can have many piglets each time she gives birth. This is called a litter. If she has eleven piglets in each litter, how many piglets will she have if she has two litters?

   _____

2. This sow has two litters every year. How many piglets can she have in two years?

   _____

3. How many piglets can she have in five years?

   _____

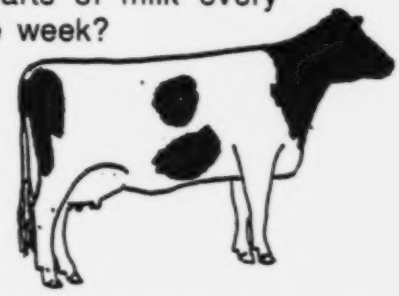
4. If she has twelve piglets in every litter, how many piglets can she have in five years?

   _____

5. How many more piglets is this than if she has eleven?

_____

6. A dairy cow gives about twenty-five quarts of milk every day. How much milk will she give in one week?



_____

7. How much milk will that cow give in the month of October?

_____

8. Ten beef steers are being sent to market. Four weigh one thousand pounds, three weigh one thousand, two hundred pounds and the rest weigh one thousand, one hundred pounds. What do they all weigh together?

_____

9. If the truck weighs ten thousand pounds when it is empty, how much does it weigh with the cattle in it?

Word Problems
- multiplication

Name: *ANSWER KEY* Date _____

LIVESTOCK PRODUCTION

1. A mother hog (called a sow) can have many piglets each time she gives birth. This is called a litter. If she has eleven piglets in each litter, how many piglets will she have if she has two litters?

   22 piglets

2. This sow has two litters every year. How many piglets can she have in two years?

   44 piglets

3. How many piglets can she have in five years?

   110 piglets

4. If she has twelve piglets in every litter, how many piglets can she have in five years?

   120 piglets

5. How many more piglets is this than if she has eleven?

10 piglets

6. A dairy cow gives about twenty-five quarts of milk every day. How much milk will she give in one week?

175 quarts

7. How much milk will that cow give in the month of October?

775 quarts

8. Ten beef steers are being sent to market. Four weigh one thousand pounds, three weigh one thousand, two hundred pounds and the rest weigh one thousand, one hundred pounds. What do they all weigh together?

10,900 lbs.

9. If the truck weighs ten thousand pounds when it is empty, how much does it weigh with the cattle in it?

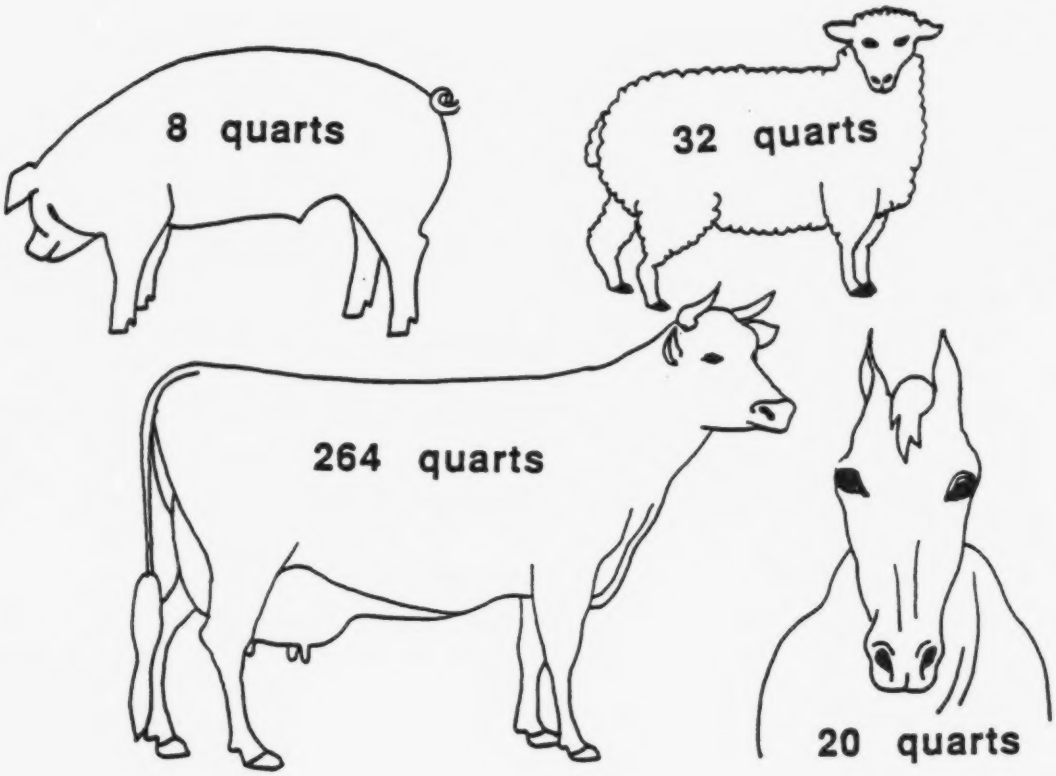
20,900 lbs

Word Problems
- **measurement**
- **multiplication**
- **division**

Name:_____Date_____

ANIMAL STOMACHS

The numbers on each of these animals show about how much their stomachs can hold. (Sheep and cattle have more than one stomach. The numbers on them show about how much all of their stomachs can hold.)



1. How many gallons can each animal's stomach hold?

Swine _____ Sheep _____

Horse _____ Cattle _____

2. A human stomach holds a little more than 1 quart. How many pints are in 1 quart?

_____ pints

3. Using the numbers of quarts shown on the animals, how many pints could each animal's stomach hold?

Swine _____

Horse _____

Sheep _____

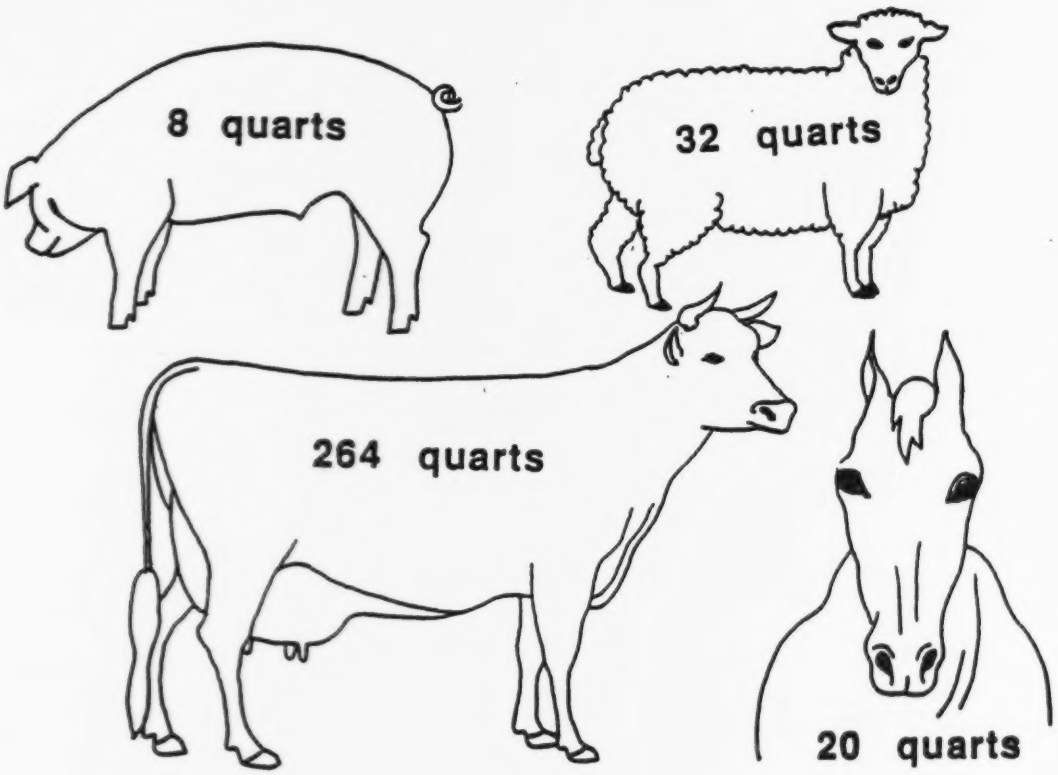
Cattle _____

Word Problems
- **measurement**
- **multiplication**
- **division**

Name: *ANSWER KEY* Date _____

ANIMAL STOMACHS

The numbers on each of these animals show about how much their stomachs can hold. (Sheep and cattle have more than one stomach. The numbers on them show about how much all of their stomachs can hold.)



1. How many gallons can each animal's stomach hold?

Swine 2 Sheep 8

Horse 5 Cattle 66

2. A human stomach holds a little more than 1 quart. How many pints are in 1 quart?

2 pints

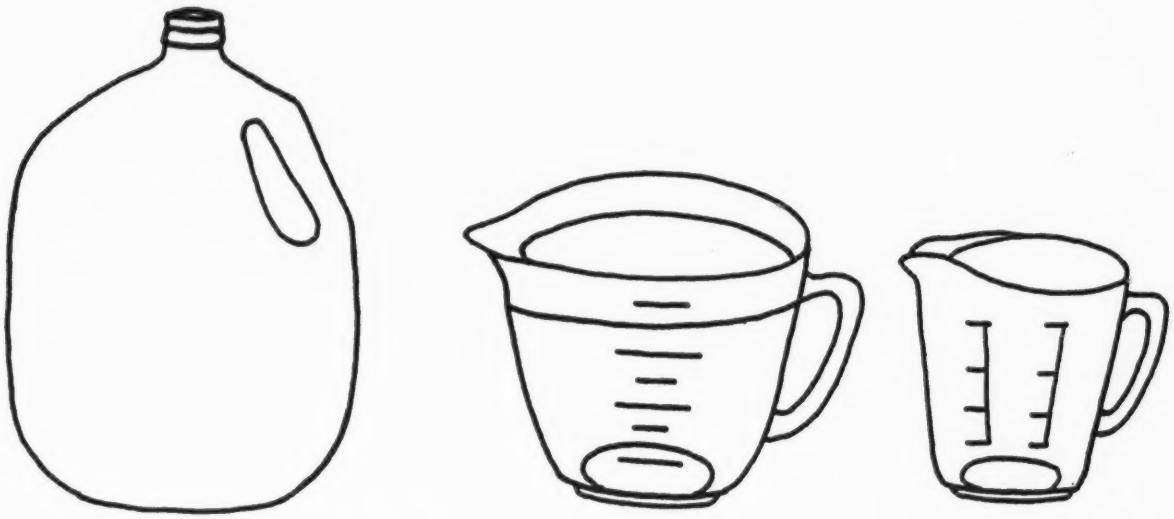
3. Using the numbers of quarts shown on the animals, how many pints could each animal's stomach hold?

Swine 16

Horse 40

Sheep 64

Cattle 528



Word Problems
- subtraction
- multiplication

Name:_____Date_____

WHEAT

1. An American eats 116 pounds of wheat each year in breads, cakes, noodles and other products. A Chinese eats 180 pounds of wheat each year, mostly in noodles. How much more wheat does a Chinese citizen eat than an American citizen?

_____

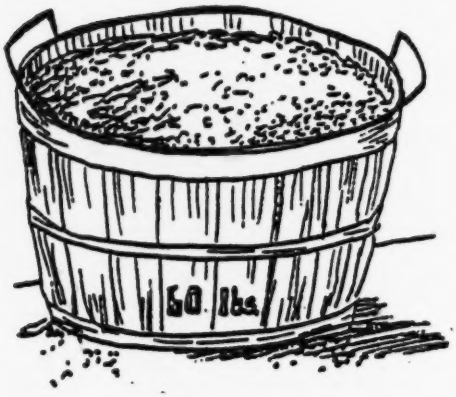
2. An Israeli eats 270 pounds of wheat each year. How much more wheat is this than an American eats?

_____

3. An Israeli eats 270 pounds of wheat each year and a Chinese eats 180 pounds of wheat. How much more does an Israeli eat ?

_____

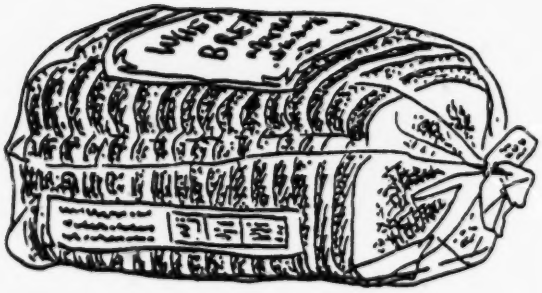
4. A bushel of wheat weighs 60 pounds. It is milled into white flour and the germ and bran are removed. A bushel of flour weighs 42 pounds. How many pounds do the bran and wheat germ weigh?



_____

5. One bushel of wheat produces 70 loaves of bread. The wheat in every loaf of bread is worth about 5¢ to the farmer. How much is the farmer paid for a bushel of wheat (in cents?)

_____



Name *ANSWER KEY* Date _____

WHEAT

1. An American eats 116 pounds of wheat each year in breads, cakes, noodles and other products. A Chinese eats 180 pounds of wheat each year, mostly in noodles. How much more wheat does a Chinese person eat than an American?

   64 lbs more

2. An Israeli eats 270 pounds of wheat each year. How much more wheat is this than an American eats?

   154 lbs

3. An Israeli eats 270 pounds of wheat each year and a Chinese eats 180 pounds of wheat. How much more does an Israeli eat ?

   90 lbs

4. A bushel of wheat weighs 60 pounds. It is milled into white flour and the germ and bran are removed. A bushel of flour weighs 42 pounds. How many pounds do the bran and wheat germ weigh?

   18 lbs

5. One bushel of wheat produces 70 loaves of bread. The wheat in every loaf of bread is worth about 5¢ to the farmer. How much is the farmer paid for a bushel of wheat (in cents?)

   350 cents

TEACHER MATERIALS

CONCEPT: Life Science II A - 2.1, 2.2, 2.3, 2.4, 1.1, 1.2, 1.5
- Life Cycle

Reading
- comprehension
- vocabulary

OBJECTIVE: Students will recognize the relationship of the life cycles of plants and animals to agriculture.

BACKGROUND: Successful agriculture is dependent upon the knowledge and manipulation of the life cycles of plants and animals. Science texts usually contain good pictures and descriptions of life cycles. However, the connection of life cycles to agriculture may not be made. This lesson is designed to explain some life cycles used in agriculture and to help students understand how this information is put to use.

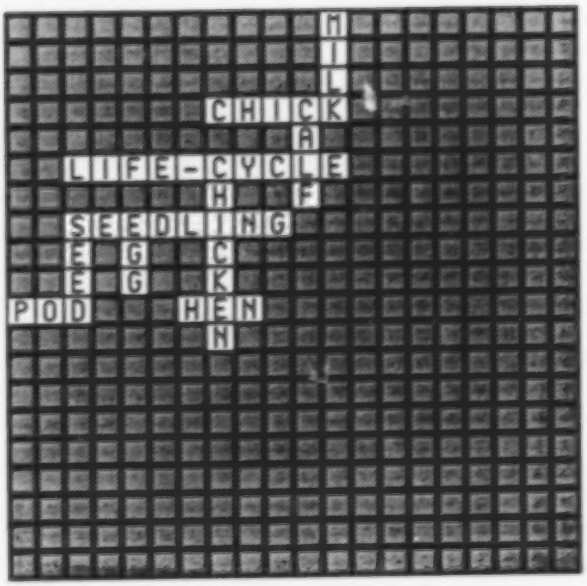
ACTIVITIES:

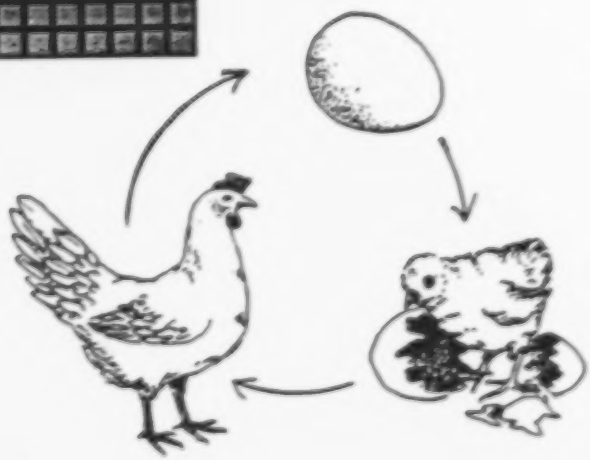
1. Copy the materials for students.
2. Have the students read the material provided about the life cycles of chickens, cows, and the pea plant.
3. Have the students complete the Crossword Puzzle coordinated with the material on life cycles.
4. You can provide a real life experience by hatching eggs in an incubator in your classroom. You may get the necessary materials, instructions, and assistance from your Cooperative Extension 4-H.

5. In the Spring; you may grow plants from seeds in your classroom, using information and instructions included with this lesson.

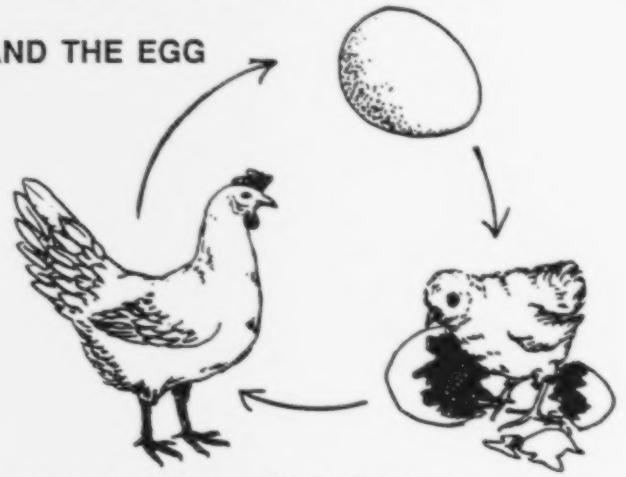
6. You may have a class discussion to relate various common foods to their place in the life cycle of plants and animals.

Answers: **Life Cycle**





THE CHICKEN AND THE EGG



Do you know what a life cycle is? It is the stages of life and changes a living thing goes through. For example, a chicken goes through three stages.

Do you see how the cycle goes on and on? An adult chicken, (the hen) lays an egg which contains everything needed to make a new chick. The egg hatches a baby chick and the chick grows into an adult chicken. The chicken mates and lays more eggs . . .

Every living thing has a life cycle. The life cycle of every organism is important because that is how we keep having more of that organism.

But, the life cycle is also important in other ways. Let's think about agriculture. We eat plants and animals at different stages in their life cycle. Look at the life cycle of the chicken again. A hen (female chicken) can lay a lot of eggs in her lifetime. Some eggs hatch to provide more chickens but, on most farms, chickens are raised just to produce eggs for us to eat. On other farms, young chicks are raised for about 8 weeks, until they weigh 3 1/2 pounds. These chickens, called broilers, are the chickens we usually eat.

You may want to hatch some eggs in your classroom to see for yourself part of the life cycle of a chicken!

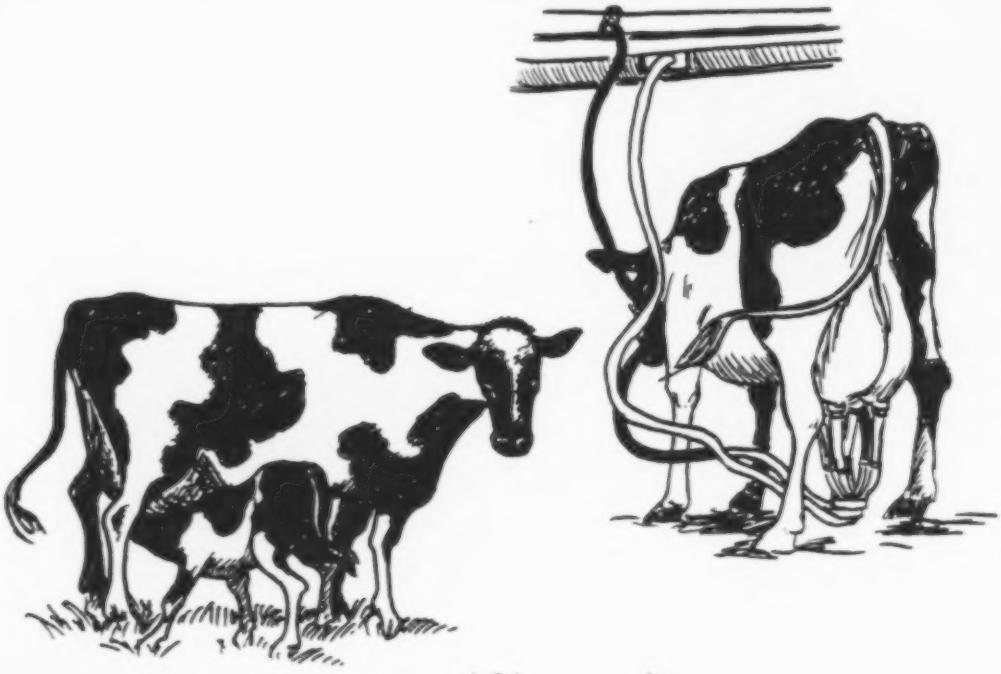
COWS, CALVES, AND MILK

The life cycle of a cow is important in providing us with milk. A cow is a mammal, which means she gives birth to a live calf, and the cow's body produces milk for the calf. The cow will continue to produce milk if she is milked regularly. The amount of milk a cow gives would eventually drop off (dry up) or stop being produced, if she didn't have another calf.

A male calf is called a bull. A female is a heifer.

On dairy farms, each cow is bred (the egg in her body is fertilized) every year and she produces a calf. The cows are milked every day and their milk is sold. Milk can be made into cheese, butter, ice cream, yogurt, or simply sold as milk. A cow will usually be milked for ten months.

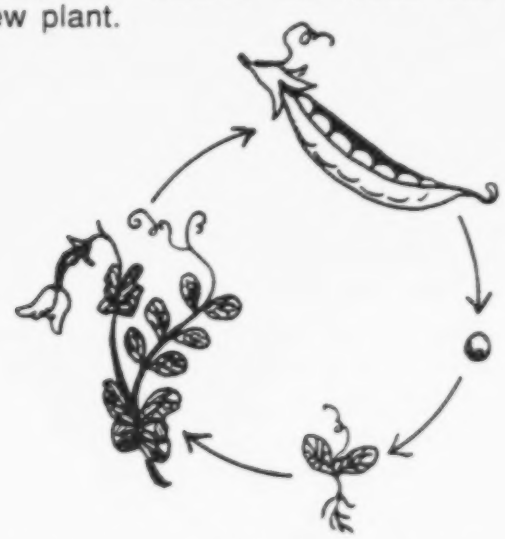
You can see how important it is to farmers to understand the life cycle. You can also see how important it is to all of us! We all depend upon the life cycle of plants and animals to provide us with food and other things we need.



PEAS ARE SEEDS, TOO

Plants have cycles, too. The life cycle of plants is very important to agriculture.

Let's look at a pea plant. If you plant a pea seed in soil, it will sprout into a tiny seedling. The seedling will grow into an adult plant. The plant has flowers which can make seeds. The new seeds and part of the flower become the pea pod. Inside the pod, the peas, which are the seeds, grow until they are as big as the peas you eat. If they are left on the plant until they are mature the peas can be planted to produce a new plant.



When we grow peas, we pick the pods off the plants and remove the peas from the pods to eat. This is called shelling peas. Most of us eat peas that were raised on farms and then are shelled and frozen or canned at processing plants.

You can observe part of the life cycle of a plant by sprouting pea seeds in your own classroom.

Name:_____ Date_____

THE LIFE CYCLE

Directions - Use these words to complete this crossword puzzle:

CALF
CHICK
CHICKEN
EGG
HEN
LIFE-CYCLE
MILK
POD
SEEDLING
SEED

Across

2. a young chicken
4. all of the stages a living thing goes through (two words)
6. a young pea plant
8. Peas are removed from a _____when they are shelled.
9. An adult female chicken is called a _____.

Down

1. A cow produces this to feed her calf.
3. a young cow
5. This animal lays the eggs we eat.
6. A pea is a _____.
7. An _____ follows the adult chicken in the life cycle.

TEACHER MATERIALS

Instructions for the teacher:

"Growing a Green Thumb" is designed for those who know little or nothing about growing plants. If you fall into this category read on; if not, simply use the plant-growing exercises for the students.

Introduction:

It would seem that some people have a green thumb and others kill every plant they have ever owned. The difference is not some wonderful personality trait, but rather knowledge. Instead of providing mountains of information on the care and feeding of each plant you may come in contact with in a lifetime, this offers a simple, common-sense approach to growing plants. It does not provide the exact care of individual plants, but gives a general idea that will help you understand the basic care of any 'type' of plant.

Life Science II A -
1.23, 1.33, 1.34,
1.4, 1.5

TEACHER MATERIALS

CONCEPTS:

1.25 - Seeds Are Found in Fruits

1.33 - Seeds Will Germinate

1.34 - Seeds Contain Stored Food Which Aids Germination

1.4 - Structures Other than Flowers Produce Offspring

1.5 - Plants can Produce Numerous Offspring

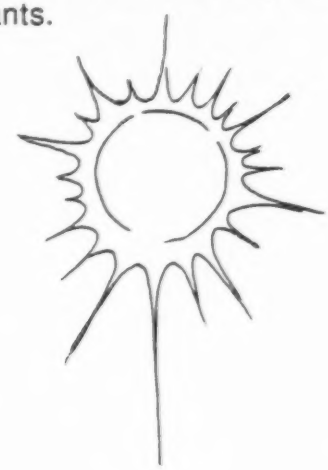
OBJECTIVE: The students will germinate seed, grow plants, and care for the plant's needs.

BACKGROUND: Plants reproduce in many ways; seeds, runners, tubers, cuttings. Agriculture uses all of these to produce crops for food and fiber. Included with these lessons is an extensive "rule of thumb" guide to growing plants and the author's own Guacamole dip to encourage the use of these ideas and to obtain the avocado pits.

GROWING A GREEN THUMB

Plants alone produce food. The rest of us simply convert plant food into fuel for our own bodies. A plant takes energy from the sun, combines the nutrients and water from the soil and produces the carbohydrates and proteins that we think of as food and fiber. When growing plants, it is important to keep that in mind.

A plant needs sunlight, water, nutrients, adequate temperature and air. If deprived of any one of these it will not be able to sustain itself. Whenever possible, use common sense in growing plants.



Light

All plants need sunlight. However, different plants have adapted to different amounts of light. That is why some plants make excellent houseplants, and others must be grown outdoors. A good rule of thumb is to consider where a plant originated and its growth pattern to estimate amount of sun it needs. For example: a short tropical tree which would have its top under large jungle trees will need diffused or low intensity sunlight. A plant that grows on a prairie, desert, or open meadow will need bright, direct sunlight.

Another good rule of thumb is to realize that any sudden changes in the amount of sunlight a plant receives will have an impact on the plant.

Artificial light is better than none. The major problem with artificial light is that the light does not contain the full spectrum of wavelengths that most plants need If only artificial light is available, both incandescent

and fluorescent light should be used. "Grow" lights can provide the full spectrum for plants.

Water and Air

All plants need water. Here again the amount of water a plant needs depends upon the adaptations a plant has made. A desert plant, having adapted to its environment, needs little water.

All plants need air, both above and below the ground. The one fact that people are not generally aware of is that a plant's roots need equal amounts of water and air. If the soil becomes water logged, the plant will literally drown. Again, the amount of air needed will depend upon the adjustments a plant has made to its environment. Cattails can thrive in standing water while a cactus would rot. Most mistakes in caring for houseplants are made because people water incorrectly. By doing so, one alters the amount of air pockets in the soil.

Water plants consistently! Once or twice a week may be sufficient for tropical plants. If the soil feels cool to the touch, the soil is moist enough. If the plant wilts, you've waited too long and it will be damaged. Don't overwater, especially if you've let the plant dry out!

Temperature

The temperature a plant needs to thrive varies with the plant. Again, think of where the plant originated. A tropical plant will not be able to withstand a freeze. The exact temperature for each plant can become complex. However, room temperature above 60°F is generally adequate for most houseplants. Germination of seeds usually requires at least a 70°F soil temperature.

Nutrients

Plants usually obtain nutrients through their roots from the soil (there are exceptions). The three major nutrients a plant needs are nitrogen, phosphorus and potassium, known by their chemical symbols N-P-K. When one purchases a 'plant food' or fertilizer, a ratio will be found on the package. This ratio tells what percent of those nutrients is in that container. A 10-10-10 ratio means that 10% of the material in the package is a nitrogen compound, 10% is a phosphorus compound and 10% is a potassium compound. There may also be some "micro-nutrients", a carrier, surfactant, and other inert ingredients used to provide easy distribution of the nutrients. The fertilizer ratio is always given by N-P-K so a 15-5-10 would be 15%N, 5%P and 10%K compounds. As a beginner, try to find an even ratio 10-10-10, 5-5-5, or 20-20-20 to fertilize with. Plants do have varying nutritional requirements as do people, but that is a more advanced lesson.

Schedule feedings on a monthly basis, following the package requirements. Do not fertilize your plants as often in late autumn or winter. The plant isn't getting much light so it will not be growing as actively. One fertilizing in late winter will suffice.

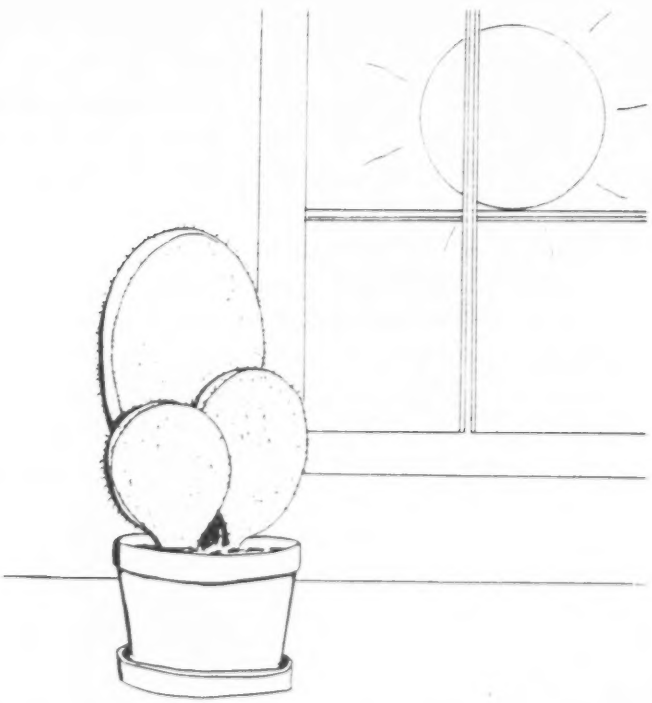
Begin monthly feedings in early spring (late March) as day length increases.

Selecting Plants

Common houseplants have been selected as houseplants because they can take some neglect, lower intensity light and lower humidity. If you are a beginner, start with common houseplants--not exotic, difficult-to-grow ferns. Good starter plants are philodendron, golden pothos, spider plants, swedish ivy, and sansevieria. Build your confidence and commitment to being a horticulturist with a plant that can adapt.

Outdoors in a garden the same is true. Tomatoes, zucchini, zinnias, marigolds and beans are good starters. Work your way up to herbs and hybrid roses.

Good luck! Hope these tips prove helpful. Just remember, plants are living things which require care!



MAKE A PLANT FROM A PLANT

MATERIALS:
- potting soil
- pots or containers of some sort (paper cups)
- water
- plants with runners: spider plant, strawberry begonia

(strawberry begonia)

- plants that reproduce from cuttings: Swedish ivy, philodendron, golden pothos, Christmas cactus, wandering jew

(golden pothos)

BACKGROUND: Some plants reproduce vegetatively as well as from seeds. Agriculture makes use of these plants mainly in the horticulture industry. Many common houseplants reproduce from cuttings or runners. Some examples are listed on the previous page.

ACTIVITIES: ***Plants from runners:***

1. Remove the offspring plants from the runner.

2. "Plant" them into moist soil making sure that the "root" area has good soil contact.

(spider plant)

3. Water the new plant.

4. Place the new plant in a place with indirect sunlight.

5. If possible, cover the plant and pot with clear plastic to simulate a greenhouse.

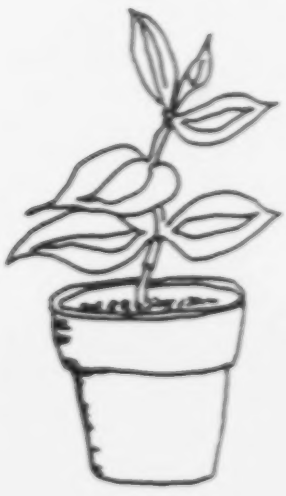
Plants from cuttings:

1. Remove the top 3-4" of the stem, keeping at least 3-4 leaves on the stem.

(wandering jew)

2. Remove the lowest leaf (the area where the leaf attaches to the stem is called a 'node'. This is where the roots will grow.)

3. "Plant" the stem in soil past the node or place it in water past the node.



Plant care:

1. Keep the soil moist, but not soaked.

2. If possible, create a greenhouse - like environment by covering the plants with plastic. Make sure the leaves don't touch the plastic. This will keep the humidity high.

3. At this stage, indirect sunlight is best until the plants begin to grow. (The plant should be producing roots and not stressing itself by trying to produce food without water or nutrients.)

4. If you start the plants in water, transplant them as soon as roots are obvious.

5. Don't expect all cuttings to survive.

6. Fertilize the plants once they begin to grow.

7. Move plants to sunlight or send them home with the students.

8. Discuss how many plants could be produced this way or by seed from one plant.

(swedish ivy)

GROW AN AVOCADO FROM THE "PIT"

MATERIALS:

- one avocado pit
- some water
- a jar with a narrow rim (2-2 1/2")
- some heavy-duty toothpicks

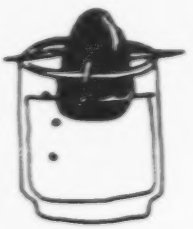
BACKGROUND: An avocado plant can grow from the pit in water. It takes quite some time for it to sprout so it would be best to set this up in the early fall. The pit is the plant's seed. Other plants which grow from one pit are plum, peach, apricot and cherries.

ACTIVITIES:

1. Peel off the brown "husk" of the pit.

2. Using 4 heavy toothpicks, pierce the avocado at right angles. Insert the toothpicks, just deeply enough to hold the pit, half way up the side of the pit.

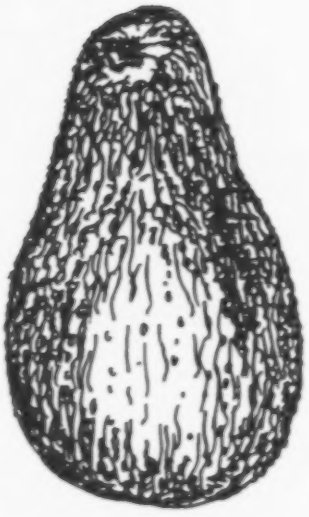
3. Suspend the pit over the jar rim, balanced on the toothpicks so that the lower half is just barely in the water.



4. Place it in a sunny location and wait patiently for it to sprout(at least 6 weeks) Add more water as needed. .

5. After roots and a sprout form, remove the toothpicks and transplant it in soil.

GUACAMOLE DIP



2	ripe avocados
1	small onion finely chopped
1/2	lime
	hot Taco sauce
1 T	mayonnaise
1	ripe, medium-size tomato, finely chopped

Gently slice the avocados in half or quarters. Remove the pits carefully. Peel off the skins. Mash the avocado, save the pits to grow. To the mashed avocado add the chopped onion, mayonnaise and tomato. Squeeze the lime into the mixture and add the Taco sauce to suit your taste. Serve with Taco chips soon after preparation. (The avocado will brown.)

Share this activity with your students! Let them see where the avocado pits come from.

PLANTS FROM SEEDS

MATERIALS: Large seeds - lima beans
peas
string beans
corn
pumpkins
sunflowers

Containers - pots
paper cups
egg cartons
mayonnaise jar with paper towels

Soil

Water

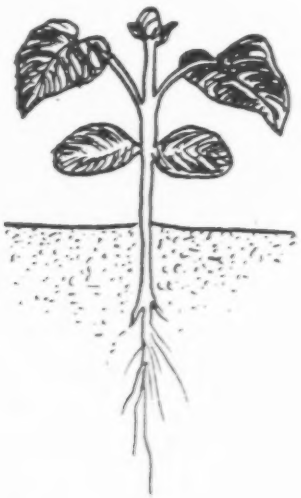
BACKGROUND: Most of the foods and fibers produced today reproduce sexually. This means that the plant produces seeds and grows from seeds. Agriculture uses the seed as foodstuffs, for oils, as feed, and to breed and grow new plants. Often plants are bred to produce more seeds per plant, per acre, per dollar invested. Students will be interested to learn that the growing process is very complex and that seed stores a great deal of food.

ACTIVITIES:

1. Sprout and grow one or more of the seeds listed above by planting them in paper cups, egg cartons or small pots. Place soil in the container, plant the seed at least an inch deep and cover it with soil. Water the soil well but don't flood it. Place the container in a warm place 70°F and keep it moist. Most seeds do not need light to sprout.

2. If pots and potting soil are not readily available, use wet paper towels. Place them inside a mayonnaise jar and place seeds in the jar between the towels and the inside of the jar. The seeds should be visible.

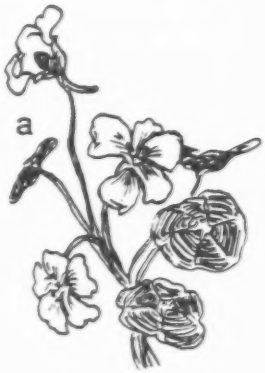
3. After the seeds sprout, point out to the students that the first leaves they see come from the seed. Allow the plant to grow until the first "real" leaves appear. These are the leaves that the new plant produced itself. Pull up the plants and examine the roots.



GROWING HERBS

MATERIALS: Herb seeds - basil, sage, chervil (a tarragon substitute for indoor growing), chives, or parsley are good for beginners

Flower seeds - nasturtiums



Herb or flower plants already grown in a greenhouse (violets)

Pots

Potting soil

Water

Sunlight

BACKGROUND: This lesson is intended to supplement the social studies lesson on herbs and the colonies.

ACTIVITIES: Have the students:

1. Plant herb and or flower seeds as instructed in the previous lesson.
2. Raise herbs obtained from a greenhouse.
3. Plant a school garden. In the country or suburbs, this may be done outside. In the city, these plants may be raised in containers.

INFORMATION: Herbs will thrive well in sunny, southern exposure windows. If this is not available, artificial lights may supplement whatever conditions you are faced with.

Herbs need a well drained soil. Clay pots are good for this reason. The clay pots will allow water to evaporate more rapidly than plastic. Water herbs every 4-5 days (only when the surface of the soil feels dry).

Once the plants are growing well, harvest the crop regularly. Cut the new growth an inch or two. Don't worry, the plant will not be harmed unless you over do it. If the plant is growing strongly the harvest of chives, parsley or basil can be done weekly.

In mid-winter it is not a good idea to harvest. Hold back on the water and fertilizer too. Give the plants a rest. Otherwise, follow the instructions in "Grow a Green Thumb".

Chives

TEACHER MATERIALS

CONCEPT: Life Science - II A - 2.2 - Animals are affected by their environment.

Reading
- comprehension
- vocabulary

OBJECTIVE: The students will recognize the 4 basic needs of wildlife which comprise its habitat.

BACKGROUND: Agriculture includes wildlife management. In order to understand wildlife management, it is important to understand the basic needs of wildlife and how these needs interact within a habitat. This lesson is designed to introduce the concept of habitat and develop your student's understanding of the 4 basic needs.

ACTIVITIES:

1. Have the students read and discuss *Wildlife Watchers*.
2. Have the students complete the worksheet on shelter.
3. Have students complete the worksheet, "A Good Habitat", to reinforce the concept of habitat.

4. Have the students complete the worksheet on habitat by researching the needs of a specific animal.
5. You can extend this lesson by researching other animals and sharing the results orally or on a bulletin board.

WILDLIFE WATCHERS

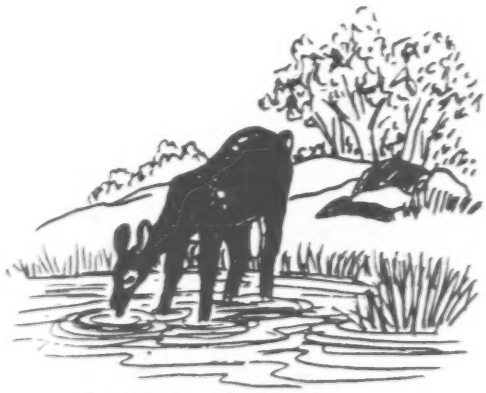
You already know a lot about wildlife, but you may not realize how much you know. You learn a lot just by being a wildlife watcher.

First of all, wildlife means all living things that have not been tamed by humans. That includes big animals, like elephants, giraffes, and whales, and small animals like mice, chipmunks and sparrows. It even includes very small animals, like insects!

Even though these animals are all very different, they all have the same 4 basic needs. Can you figure out what these needs are? I'm sure you already know some of them.

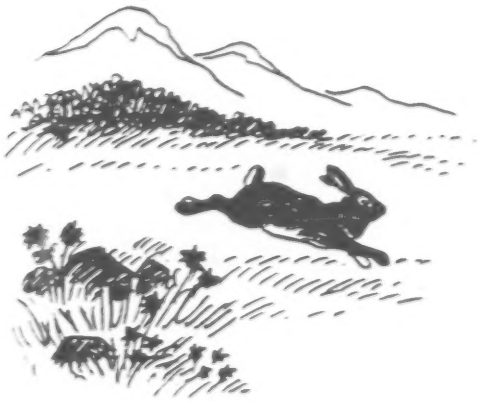
FOOD

WATER



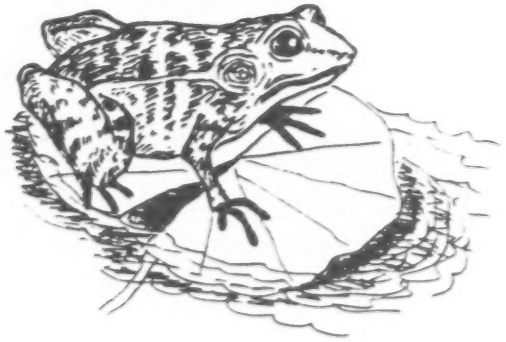
COVER or SHELTER

LIVING SPACE



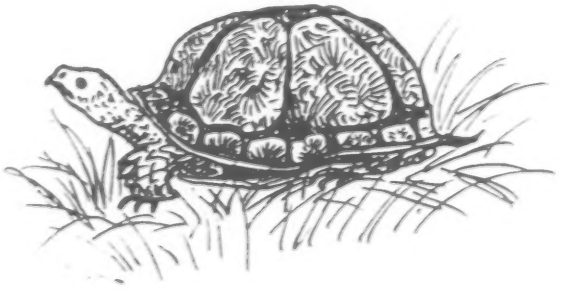
Any area that fills all 4 basic needs for an animal is called its *habitat*. The habitat for a giraffe is different from the habitat for a chipmunk because animals meet their needs in different ways.

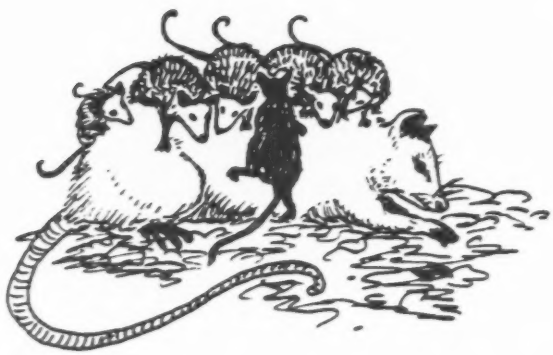
Every animal needs food, but different animals eat different foods. Some animals eat plants, some eat animals, and some eat both plants and animals.



All animals need water, but some animals can get their water from dew on the grass or from the moisture in their food. Other animals must have a pond or stream to drink from.

Every animal needs some kind of cover or shelter from the weather and from other animals that might eat them. Some animals, like chipmunks and rabbits, protect themselves in holes in the ground. Other animals, like deer and moose, find shelter in thick brush or forests. This animal carries its shelter with it in the form of a shell.





Every animal also needs space. A field mouse only needs a few square feet of space. A bear needs a few square miles of space! Within that space, an animal may not allow very many animals of its own kind. In other words, in a bear's space, the bear may allow many rabbits, mice, birds, foxes and insects, but not other bears. This is also called territory. If animals become crowded they may fight, leave their young to die or not produce as many young.

Can you describe the habitat of your favorite wild animal?

Name _____ Date _____

List as many animals as you can that carry their shelter with them.

Name: _____Date_____

This is your chance to find out about an animal you are especially interested in. Use an encyclopedia to learn about the habitat of a wild animal, and then draw a picture that shows your animal in its habitat.

Name of the animal:_____

Food: _____

Where does this animal get water? _____

Cover or shelter: _____

What habits does this animal have to make sure it has enough space?

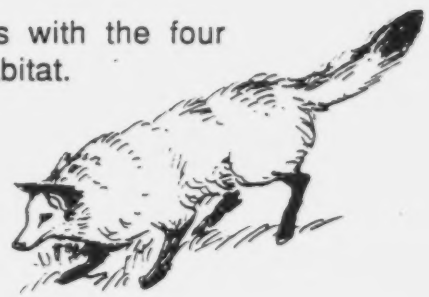
_____

_____

NAME: _____Date_____

A Good Habitat

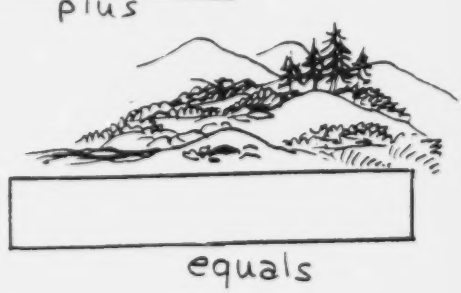
What makes a good habitat? Fill in the boxes with the four animal needs which must be met by a good habitat.



plus

plus

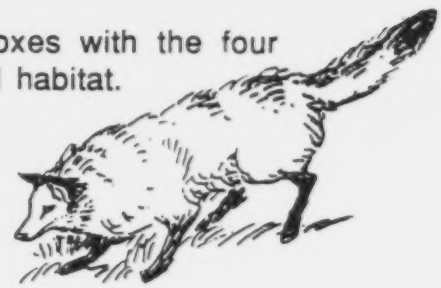
plus



equals

NAME: _____***ANSWER KEY***_____ Date _____

What makes a good habitat? Fill in the boxes with the four animal needs which must be met by a good habitat.



food

plus

water

plus

shelter

plus

living space

equals

TEACHER MATERIALS

CONCEPTS:

Social Studies - culture (social pp. 44, 48, 50)
- change (social p. 40)
- interdependence (economic p. 54)
- environment (geographic p. 56)

Reading - comprehension
- vocabulary

Language - word origin

OBJECTIVES:

1) The students will gain an appreciation for the native Americans as farmers.

2) The students will be able to list foods and flavorings which came from America.

BACKGROUND:

The American Indian was a prosperous farmer as well as hunter and gatherer. Sullivan's campaign report refers to the fact that his army destroyed hundreds of acres of orchards in the Genesee Valley to quell the Iroquois. At the time our country was settled, the Indian people did not have a written history; consequently, much of the credit they deserve for developing breeds of plants and advanced farming techniques is lacking. Only today is research being done to document this culture. A few of these foods appear in New York is Growing.

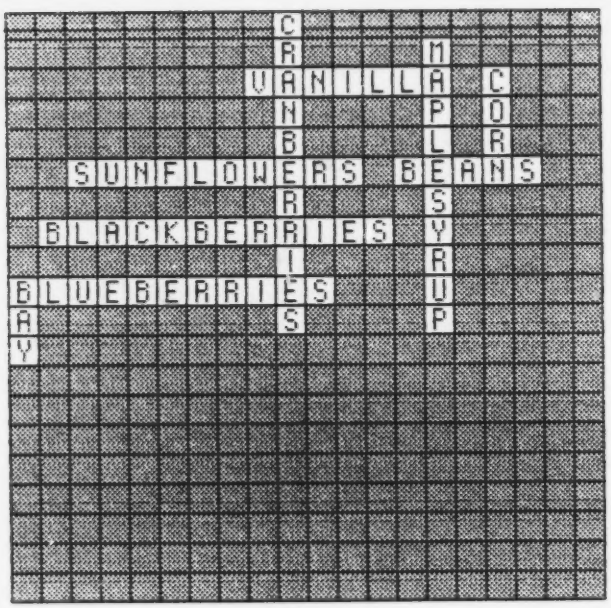
80% of the plants we presently eat were unknown to Europeans before 1492. Textbooks refer to the native Americans growing the three sisters; corn, squash and beans. However many, many other food plants were developed here in the Americas.

ACTIVITIES: 1) Have the students read pages 18-22 in New York is Growing.

2) Have the students complete the Crossword puzzle *"Foods and Flavorings from America"*.

3) Plan and conduct a native American food banquet at Thanksgiving time. See the lesson on "Plants and the Colonies" for recipes.

Answers: Food and Flavorings From America

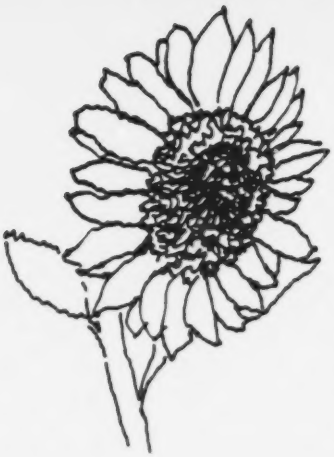


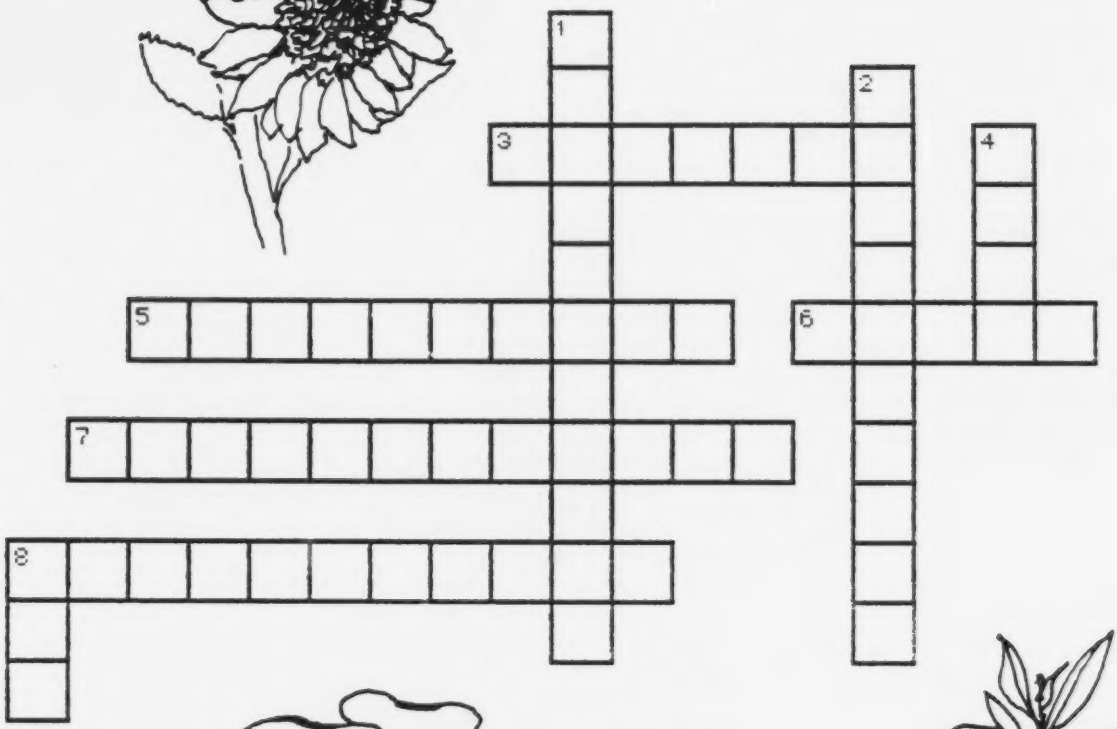
Name:_____ Date_____

FOOD AND FLAVORINGS FROM AMERICA

Both North and South America were the origin of many foods and flavorings we now use. The Indian tribes on both continents were not only hunters and gatherers, they were farmers and fishermen. Many of these foods they grew and developed from wild plants. They used fertilizer, developed seed types, grew orchards and vineyards, and created many complex foods. Fill in this crossword puzzle with these foods from America.

BAY
BEANS
BLACKBERRIES
BLUEBERRIES
CORN
CRANBERRIES
MAPLE SYRUP
SUNFLOWERS
VANILLA





Across

3. _____ ice cream is white, chocolate is brown and strawberry is pink.
5. We eat the seeds from these large yellow flowers.
6. Some types of _____ are lima, kidney, and navy.
7. Sometimes these fruits are called black raspberries.
8. These little fruits are put into pancakes and muffins.

Down

1. little red fruits which are made into a sauce and served with turkey
2. The Indians made _____ _____ by boiling down the sap of a tree.
4. Pop, sweet, dent and flour are types of _____.
8. _____ leaves are used to flavor spaghetti sauce

TEACHER MATERIALS

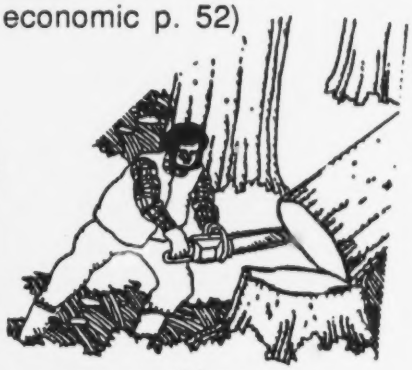
CONCEPT:

Social Studies - interdependence (economic p. 54)
- culture (social pp. 46, 48)
- change (economic p. 52)

Composition - to explain
- grammar
- to describe

Mathematics - sequencing

Reading - vocabulary



OBJECTIVE: The student will describe in sequence "How a House is Built".

BACKGROUND: The steps from harvesting lumber to building a house are very complex. Each stage is tied to a separate industry and requires financial backing. This pictorial shows a simplified version of these industries in New York with the bank linking each stage.

ACTIVITIES:

1. Make copies of "Logging Language" and the exercise "How a House is Built".

2. Have the students describe in writing what they see on pages 16-17 in New York is Growing, beginning in the upper left hand corner of the page and moving counter clockwise. Instruct them to use "Logging Language".

3. The students should explain why the roads all connect to the bank. What role does the bank play at each stage?

4. Ask "What would happen to the system if one of these businesses stopped?".

5. If this is too difficult for the students, "walk" through it with them. Have them put themselves in the forest watching each step.

6. Have the students share their own experiences watching construction. If you are an urban school, ask how housing construction differs with other building materials such as concrete.

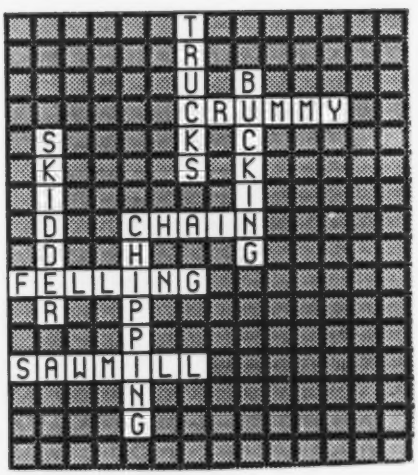
   a. Where is wood used?

   b. What else is wood used for?

7. List as a class how many uses wood has in their homes, i.e. furniture, cutting boards, knife handles, paneling, etc.

8. Have the students complete the Crossword Puzzle "Logging Language" and the Word Find "Made From Wood".

Answers: Logging Language



LOGGING LANGUAGE

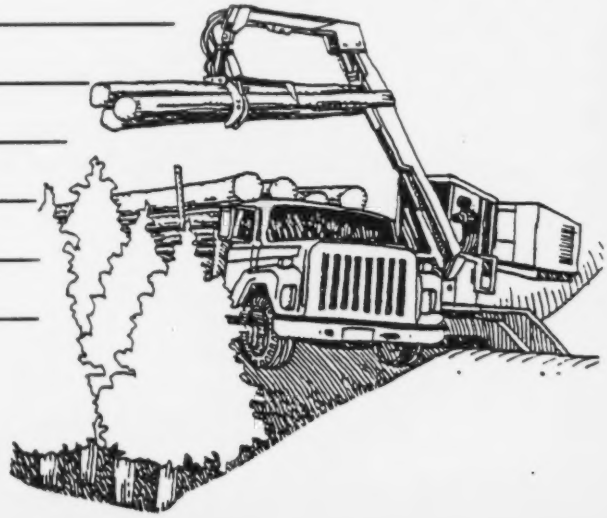
Felling	-	cutting down a tree
Bucking	-	cutting tree into log lengths
Crummy	-	bus which carries loggers to work
Setting chokers	-	attaching wire rope to logs so they can be moved
Log Skidder	-	machine which picks up logs and moves them
Log Trucks	-	large trucks which carry logs from forest to sawmill
Chain Saws	-	hand held saw with an engine which turns the chain blades
Chipping	-	chewing a tree into small chips for papermaking
Sawmill	-	business which cuts logs into boards of different sizes

Name_____ Date_____

Using "Logging Language," explain the process that is taking place on pages 16-17 of New York is Growing. Start in the upper left hand corner and move counter-clockwise as you write the story. Be sure to include the bank. Why does it connect to each stage?

"HOW A HOUSE IS BUILT?"

Trees grow in a forest. They are_____

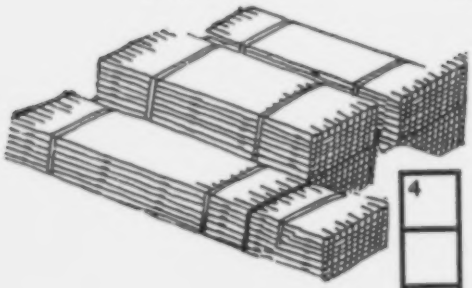


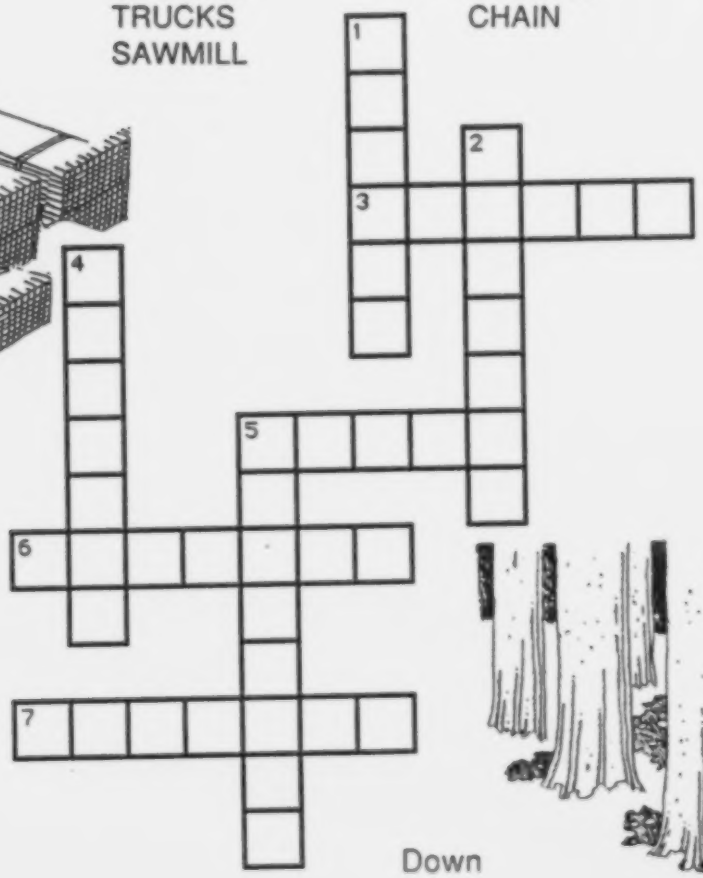
Name _____ Date _____

Logging Language

Complete the crossword puzzle using the words listed below.

FELLING
SKIDDER
CHIPPING
BUCKING
TRUCKS
SAWMILL
CRUMMY
CHAIN





Across

3. A _____ carries loggers to the forest.
5. _____ saws are used to cut down trees.
6. cutting down a tree
7. A business that cuts logs into lumber.

Down

1. These carry lumber to the building site.
2. cutting a tree into logs
4. A log _____ moves trees.
5. chewing a tree up for paper

Name_____Date _____

WORD FIND - Made from Wood

Find these products that are made from wood. The words can be up, down, right to left, or diagonally. Use these words.

PAPER	BEDS	BOOKS
CARDBOARD	HANDLES	INSULATION
CHAIRS	SHINGLES	WINDOW SILLS
BOOK CASES	RAILROAD TIES	TURPENTINE
FLAVORINGS	DYES	SOAP
FUEL	BAGS	

P O E R T R E B V Y U Z X
R T U R P E N T I N E P P
H A N D L E S U T O B B I
S H I N G L E S D I O F M
D S R L Y T F R L T O L V
P A P E R B A M N A K A W
B O O K S O A P G L C V E
N W E Y B X A L I U A O K
S E Y D E A N D K S S R T
V B R K D R G F T N E I L
N A U I S L J S U I S N M
C H A I R S N B U E E G T
V W I N D O W S I L L S G
H Y U I O U L P A Q W R T

Name *ANSWER KEY* Date _____

WORD FIND - Made from Wood

Find these products that are made from wood. The words can be up, down, right to left, or diagonally. Use these words.

PAPER	BEDS	BOOKS
CARDBOARD	HANDLES	INSULATION
CHAIRS	SHINGLES	WINDOW SILLS
BOOK CASES	RAILROAD TIES	TURPENTINE
FLAVORINGS	DYES	SOAP
FUEL	BAGS	

P O E R T R E B V Y U Z X
R T U R P E N T I N E P P
H A N D L E S U T O B B I
S H I N G L E S D I O F M
D S R L Y T F R L T O L V
P A P E R B A M N A K A W
B O O K S O A P G L C V E
N W E Y B X A L I U A O K
S E Y D E A N D K S S R T
V B R K D R G F T N E I L
N A U I S L J S U I S N M
C H A I R S N B U E E G T
V W I N D O W S I L L S G
H Y U I O U L P A Q W R T

TEACHER MATERIALS

CONCEPT:

Social Studies - culture (social p. 50)
- change (economic p. 52)
- interdependence (economic p. 52)

Mathematics - sequencing

OBJECTIVES:

1. The students will describe inventions from New York which contributed to the economic and historic development of the United States.

2. The students will recognize specific technological advances that have had an impact on food and fiber production.

3. The students will recognize the dependence of all of society upon agricultural efficiency and productivity.

BACKGROUND: Many agricultural inventions and innovations which were developed in New York have had a great impact on the rest of the country.

On pages 26-27 in New York is Growing, is a list of such inventions and events titled "From Dutch Colony to the Empire State."

Alone, none of these events has had a great impact, but the cumulative effect has been phenomenal. This is only a small listing of the events and innovations that have been the hallmark of the Empire State.

Specific examples of technology in agriculture are important in demonstrating the increased

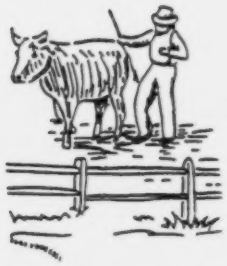
efficiency of food production. It may not be readily apparent to students that our society benefits from technology in agriculture by having access to a wide variety of foods, year round, at relatively low cost. The information in New York is Growing transports our society from producing food almost totally by hand to 1950, and mechanized food production. The following pages give New York inventions and events from that point until today. The activities are designed to increase awareness of both the technological advances in agriculture and the importance of these advances in all of our lives.

ACTIVITIES:

1. Have the students develop a pictorial timeline using the information on pp. 26-27 in New York is Growing, and the attached drawings, titles and dates. Copy the pages and have the students assemble the titles, dates, and sequence.

2. Complete the timeline by adding the inventions since 1950.

3. Invite the county, town or city historical society into the classroom to supplement this activity. Select one event to focus on and explore what else was occurring at the same time.



4. Class discussion of the effects which the efficiency of modern agriculture has on our lifestyle. The following information can be used to trigger a discussion relating to the variety of ways we can spend our time now compared with people in the 1700's.

    * 1 farmer fed 3 people in the 1700's
    * 1 farmer fed 79 people in 1980
    * 1 farmer feeds 116 people today

5. Working in groups, have the students

brainstorm to think of something which needs to be invented to solve some kind of problem or increase productivity. Then have them report to the class. They could also do a creative writing assignment describing their invention: what it looks like, what it does, how to use it, etc.

6 Play "What if..." Ask the students to think how farming would be affected if suddenly there were no more tractors made, or no fuel available, or no milking machines, or no electricity, etc. How would these changes affect the rest of society? The students may write stories or have a class or group discussion about the results of the suggested change.

ANSWER KEY

FIRST SHEEP

FIRST NURSERY

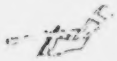
FIRST ORCHARD

NINE OUT OF TEN FARMING

NORTHERN SPY

SPINDLE WHEEL

CHEESE FACTORY

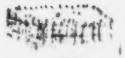

CAST IRON PLOW

ERIE CANAL OPENED

FIRST IN MEAT PROCESSING

TILE DRAINAGE

FLOUR CITY


FIRST IN HAY AND POULTRY

FIRST GRAIN ELEVATOR

HAMBLETONIAN IS BORN

COMMERCIAL DUCK RAISING

NEW YORK PRODUCE EXCHANGE

BLACK RASPBERRIES

ROSE GROWER NEWARK

MAIL ORDER DANSVILLE

FIRST TRANSPORTATION OF BUTTER

CORNELL CHARTERED

FIRST STEAM TRACTOR

NEW YORK COTTON EXCHANGE

OVID FIRST AGRICULTURAL COLLEGE

FIRST BUTTER FACTORY

ONE FARM WORKER

ORANGE- FLORIDA TO NEW YORK

FIRST STATE FOREST PRESERVE

TESTING FOR BUTTERFAT

FIRST HYBRID GRAPE

FIRST FARM BUREAU BROOME COUNTY

FIRST CROP DUSTER

APPLE TREE ROOTS NEED O_2

FOOD STAMPS ROCHESTER

NEW YORK STATE NURSERYMAN'S ASSOC.

NEW YORK STATE FLOWER GROWERS, INC.

BARBECUE SAUCE FOR CHICKEN

COMMERCIAL POINSETTIA PRODUCTION

HEAT TOLERANT ICEBERG LETTUCE

MACHINE TO PICK CHERRIES

CHICKEN PATTIES, NUGGETS, AND LOAVES

"THE EMPIRE APPLE"

MACHINE TO PICK GRAPES

JONAGOLD APPLE

CAYUGA WHITE GRAPE

ENERGY EFFICIENT GREENHOUSES

MANURE DIGESTER

LIBERTY APPLE

ULTRA FILTRATION OF MILK

ALFALFA

SEEDLESS N.Y. GRAPE

4-108

FROM 1950 TO TODAY

1950's	The growing of Poinsettias in greenhouses is possible.
1955	An Iceberg lettuce is created which can stand high temperatures.
1960's	Cucumber breeding begins.
1961	Cornell patents controlled packaging. This helps to store fruits and vegetables for longer periods of time.
1965	The cherry picker is invented. Now cherries can be harvested by a machine in less time.
	Chicken patties, nuggets and loaves are developed.
1966	The Empire Apple is introduced by the New York Experimental Station.
1967	A grape harvester is invented.
1968	Jonagold Apple is named and released by Cornell.
1972	The Cayuga Wine Grape is developed by Cornell.
1975-80	Energy efficient greenhouses are researched.

1977	Methane gas (natural gas) is produced from manure.
1978	The Liberty Apple is developed. It needs no chemical sprays to control major apple diseases.
1979	A method of ultrafiltration of milk is developed.
1984	Alfalfa which is resistant to root rot and wilt is developed.
1985	A seedless grape which will grow well in New York is developed.

DATES

1625	1850	1943
1647	1850	1946
1768	1850	1950's
1790	1853	1955
1800	1856	1960's
1803	1862	1961
1810	1865	1965
1819	1870	1966
1825	1870	1967
1825	1873	1968
1835	1885	1972
1840	1890	1975-80
1840	1908	1977
1842	1911	1978
1849	1924	1979
1850	1938	1984
1850	1939	1985

TITLES

FIRST SHEEP

FIRST NURSERY

FIRST ORCHARD

NINE OUT OF TEN FARMING

NORTHERN SPY

SPINDLE WHEEL

CHEESE FACTORY

CAST IRON PLOW

ERIE CANAL OPENED

FIRST IN MEAT PROCESSING

TILE DRAINAGE

FLOUR CITY

FIRST IN HAY AND POULTRY

FIRST GRAIN ELEVATOR

HAMBLETONIAN IS BORN

COMMERCIAL DUCK RAISING

NEW YORK PRODUCE EXCHANGE

BLACK RASPBERRIES

ROSE GROWER

MAIL ORDER

FIRST TRANSPORTATION OF BUTTER

FIRST AGRICULTURAL COLLEGE

FIRST BUTTER FACTORY

ONE FARM WORKER FEEDS FIVE PEOPLE

CORNELL CHARTERED

FIRST STEAM TRACTOR

NEW YORK COTTON EXCHANGE

ORANGE- FLORIDA TO NEW YORK

FIRST STATE FOREST PRESERVE

TESTING FOR BUTTERFAT

FIRST HYBRID GRAPE

FIRST FARM BUREAU

FIRST CROP DUSTER

APPLE TREE ROOTS NEED OXYGEN

FOOD STAMPS

NEW YORK STATE NURSERYMAN'S ASSOCIATION

NEW YORK STATE FLOWER GROWERS, INC.

BARBECUE SAUCE FOR CHICKEN

NEWARK

DANSVILLE

OVID

BROOME COUNTY

ROCHESTER

COMMERCIAL POINSETTIA PRODUCTION

HEAT TOLERANT ICEBERG LETTUCE

MACHINE TO PICK CHERRIES (CHERRY PICKER)

CHICKEN PATTIES, NUGGETS, AND LOAVES

"THE EMPIRE APPLE"

MACHINE TO PICK GRAPES (GRAPE HARVESTER)

JONAGOLD APPLE

CAYUGA WHITE GRAPE

ENERGY EFFICIENT GREENHOUSES

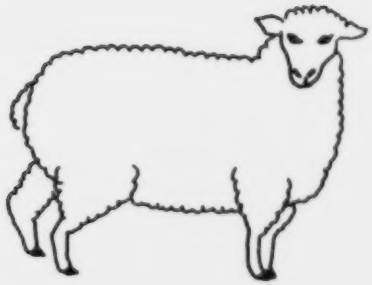
MANURE DIGESTER

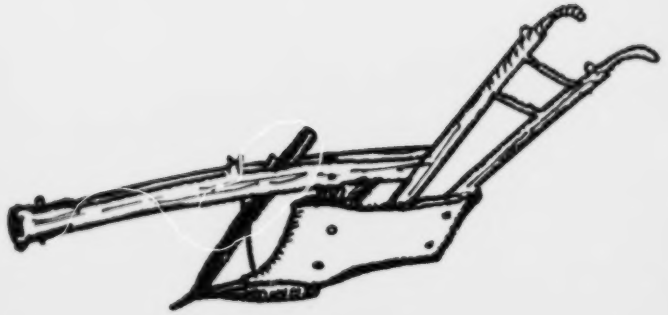
LIBERTY APPLE

ULTRA FILTRATION OF MILK

ALFALFA (RESISTANT ALFALFA)

SEEDLESS N.Y. GRAPE





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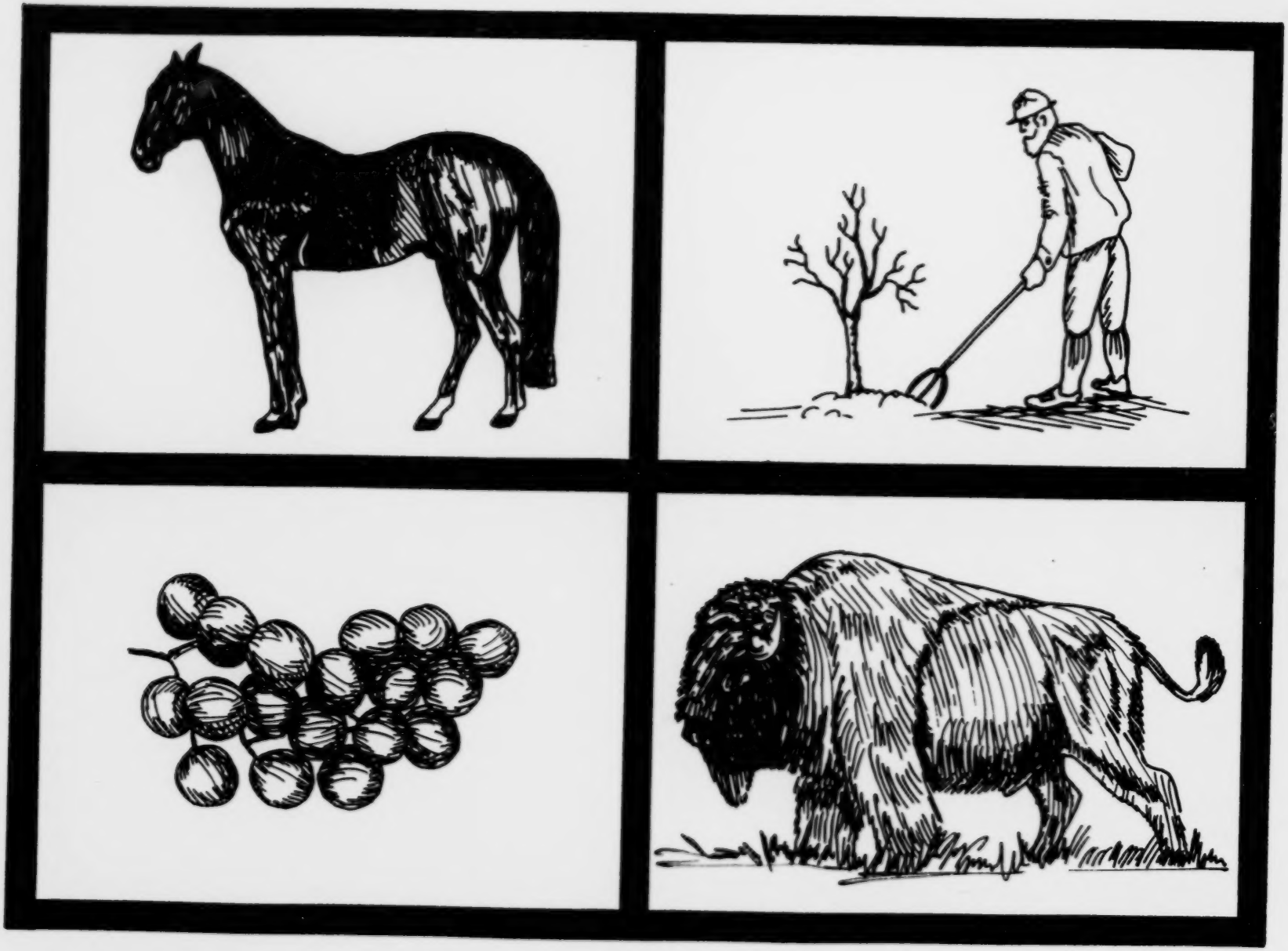

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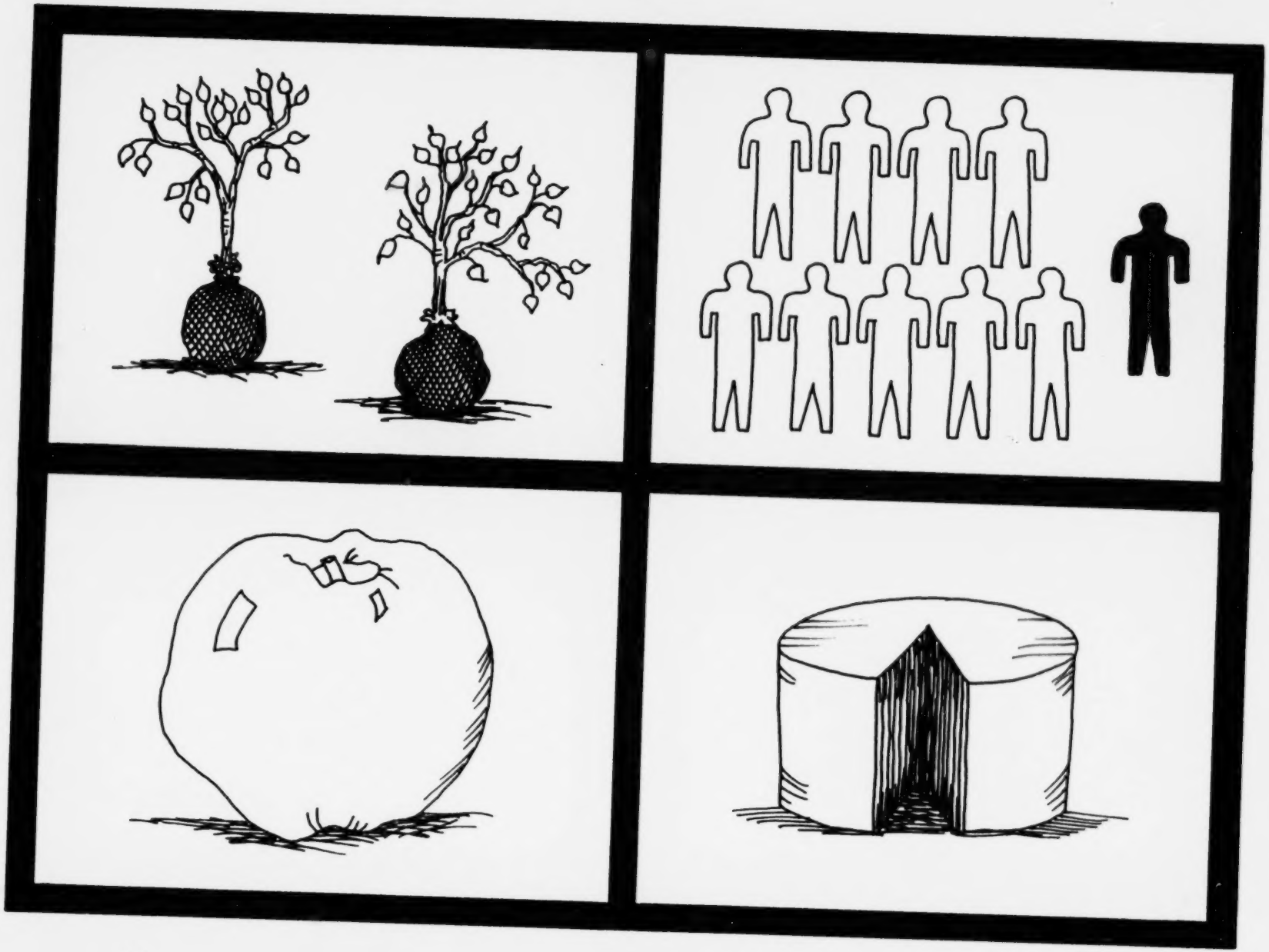

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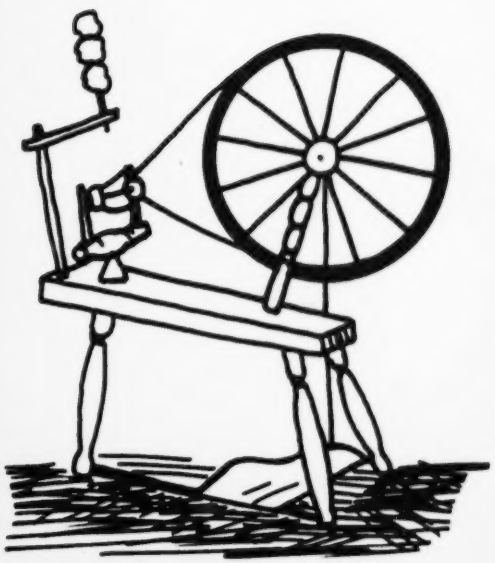
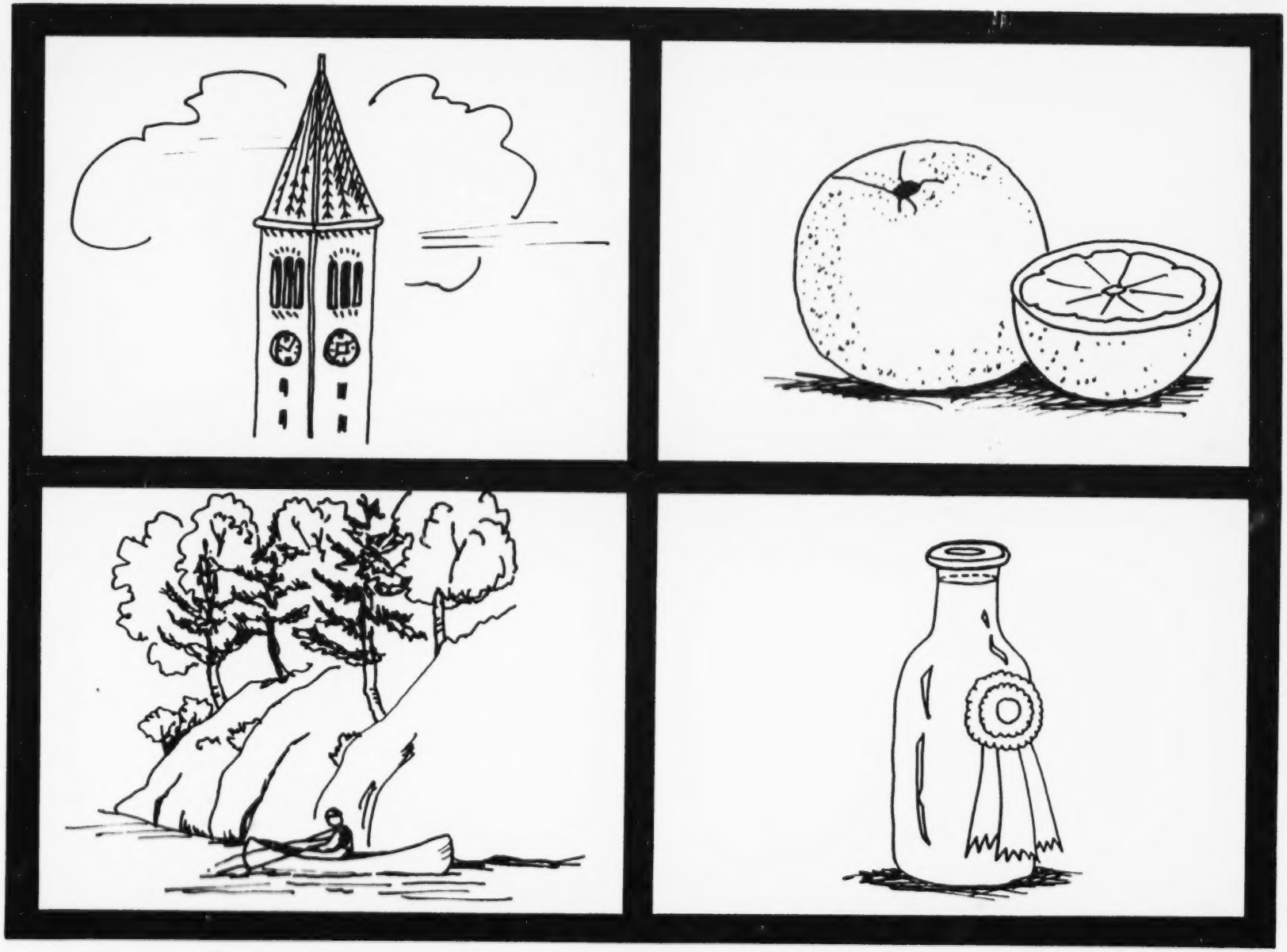
GRAIN
ELEVATOR





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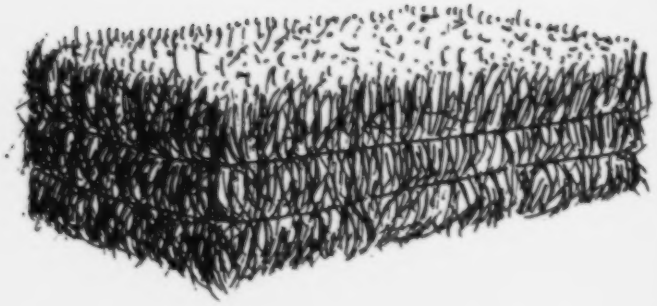

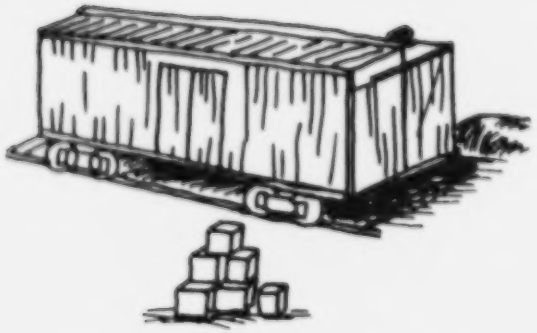

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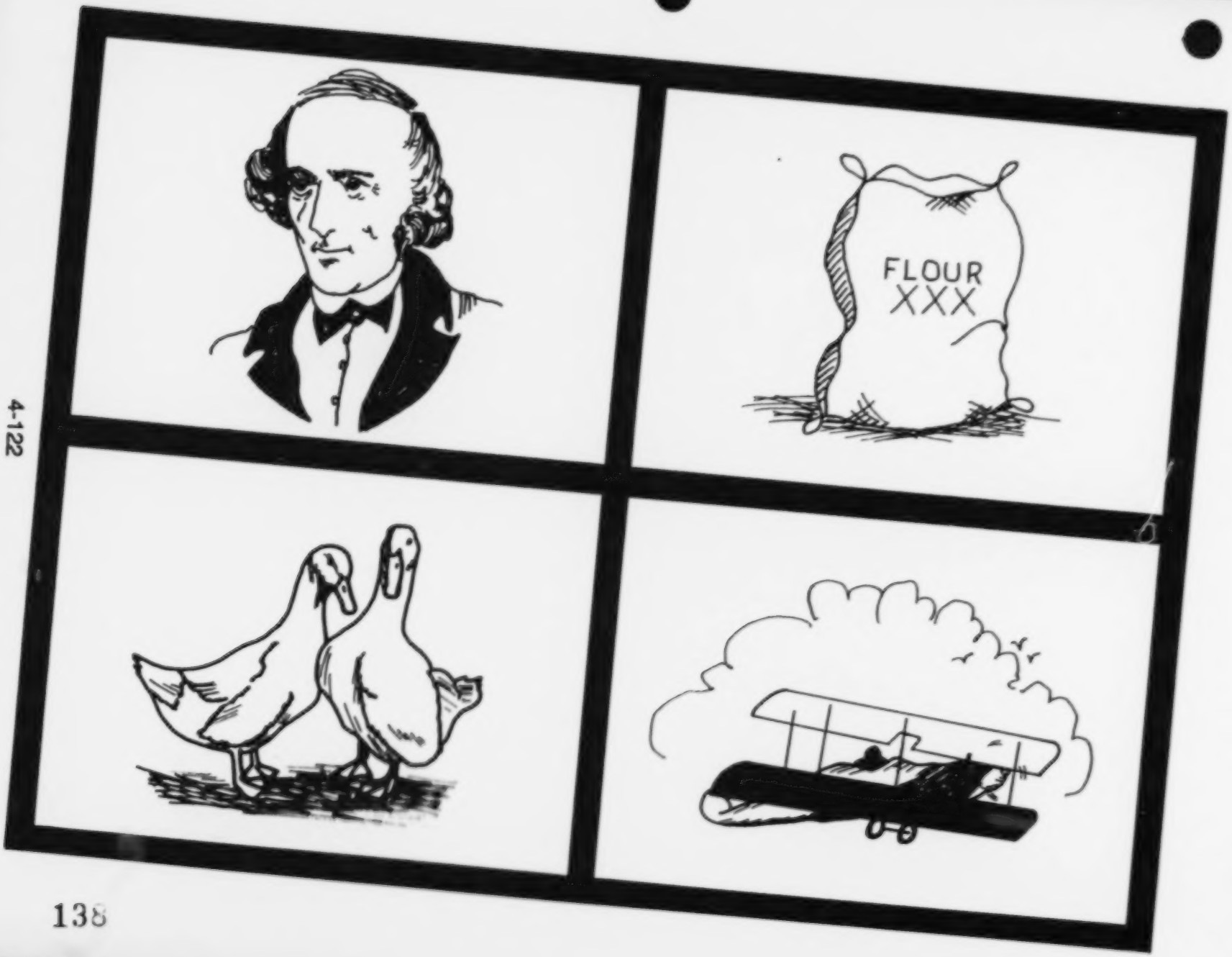

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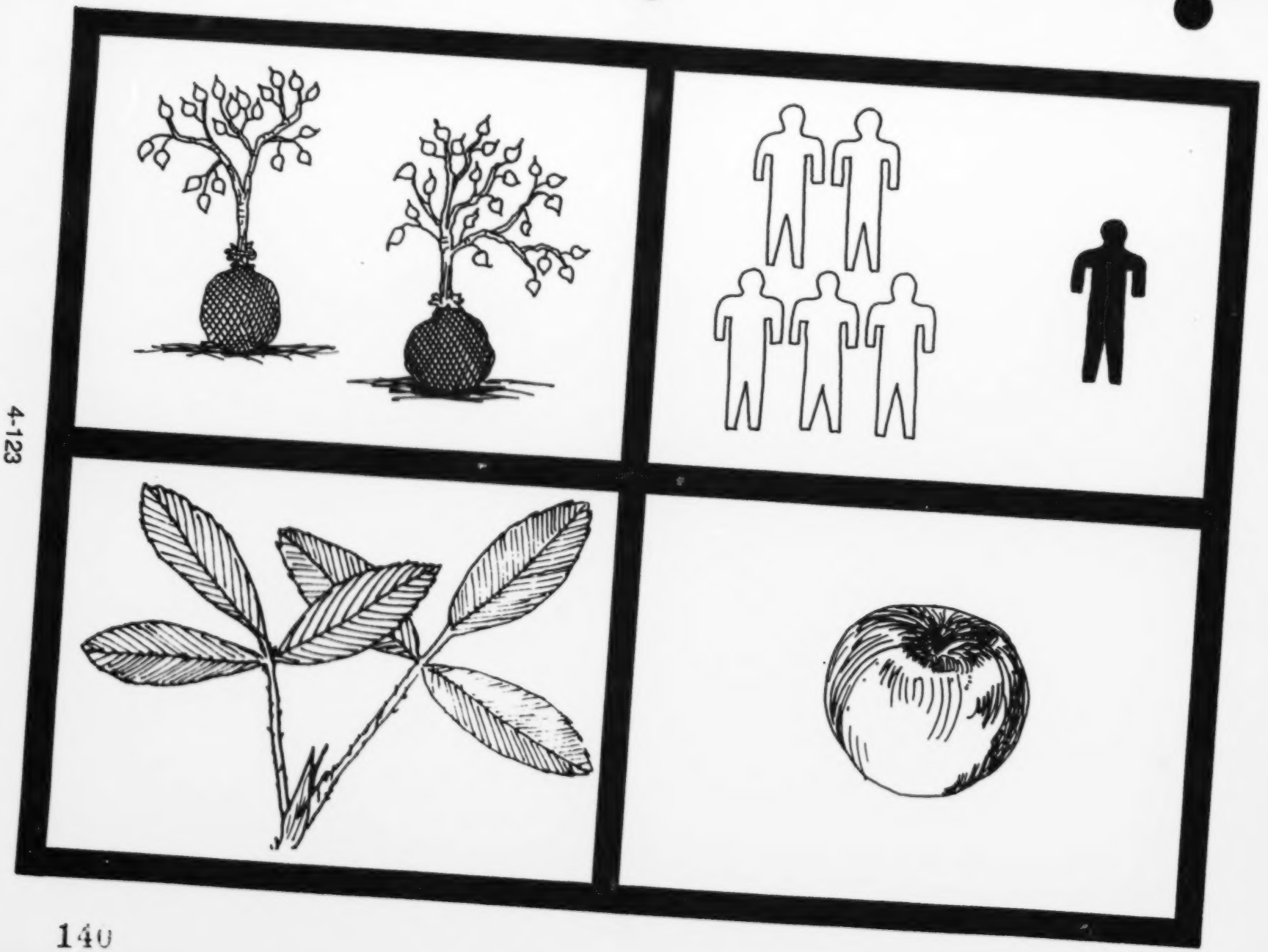

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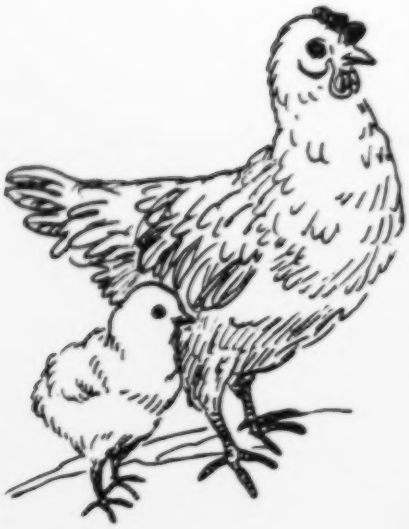

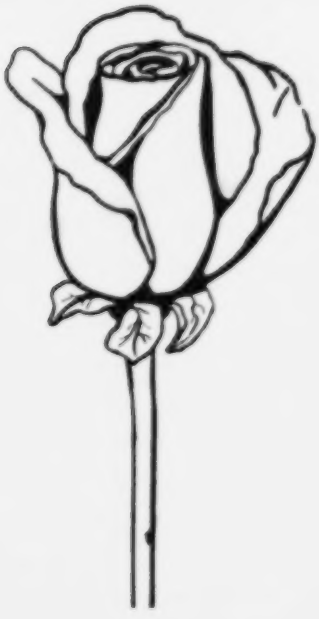

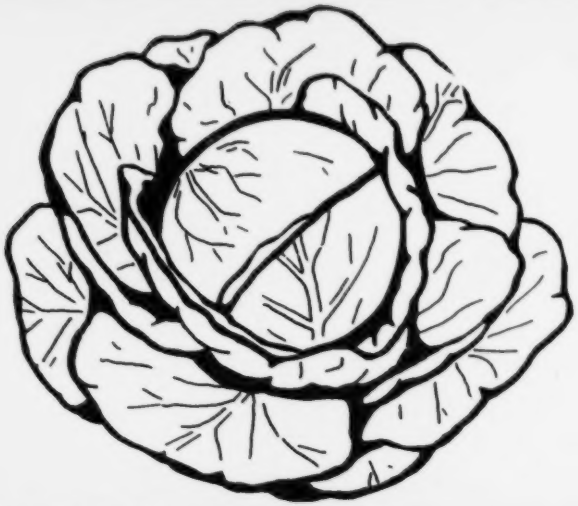

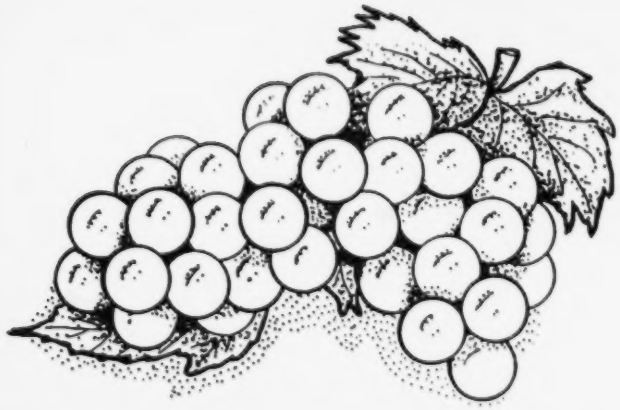

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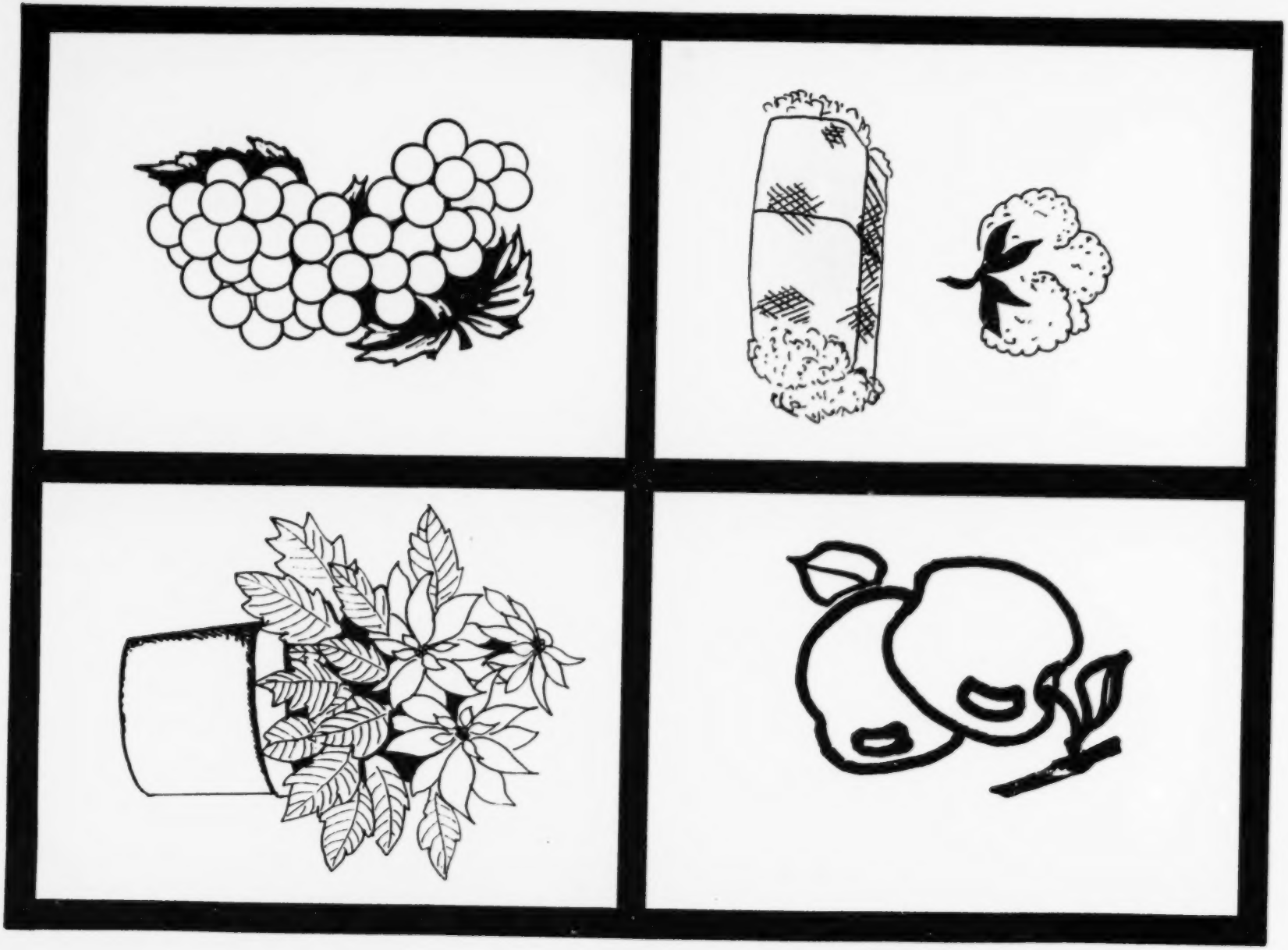

4-126

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LK MI
GRADE A MILK

4-128

TEACHER MATERIALS

CONCEPT:

Social Studies
- interdependence (economic p. 52)
- change (economic p. 52)
- environment (geographic p. 56)

Composition
- to explain

Reading
- for comprehension
- vocabulary

OBJECTIVES: Students will be able to trace the path of food and fiber through production, processing, distribution, and retailing.

BACKGROUND: Agriculture today is extremely diverse and depends upon the interrelationship of producers, processors, transportation systems, and retailers. There are support systems behind each of these areas, but the purpose of this lesson is simply to develop an awareness of the path food takes from producer to consumer. The inclusion of the manufacture of aluminum foil is intended to draw the parallel between production of manufactured products and food items and is also used in another lesson to show that producers are also consumers.

ACTIVITIES:

1. Have the students read pages 8-14 in New York is Growing.

2. Have the students complete the worksheet "The Food and Fiber System" to reinforce learning of terminology (Social Studies).

3. Have the students write stories from the point of view of one of the products described in New York is Growing, telling the story from production to consumption.

4. Review pages 8-14 in New York is Growing, tracing the production of food products and discuss the variety of careers apparent. Point out that all of these careers are related to agriculture, but many are not actually farming.

5. Have the students complete the work sheet "Careers" matching careers to parts of the food system.

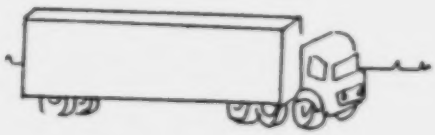
Name_____Date_____

THE FOOD AND FIBER SYSTEM

MATCHING: Write the letter of the word in the right hand column in the blank in the left hand column.

1. _____ The sauce is canned to prevent spoilage.
2. _____ Sauce is sold in stores and schools.
3. _____ Apples grow on trees in orchards.
4. _____ Trucks haul the sauce to store.

a. production
b. processing
c. distribution
d. retailing



5. _____ Cows are usually milked twice a day.
6. _____ Students buy milk at school.
7. _____ Milk is taken from the processing plant to stores.
8. _____ Milk is put in bottles or cartons.

a. production
b. processing
c. distribution
d. retailing

TRUE OR FALSE:

9. _____ Aluminum foil and sauerkraut both result from production and processing.

10. _____ The food you eat results from the work of many people doing different jobs.

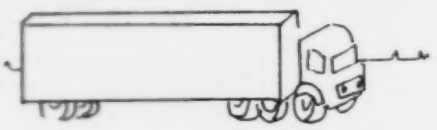
Name: ___*ANSWER KEY*_____Date: _____

THE FOOD AND FIBER SYSTEM

MATCHING: Write the letter of the word in the right hand column in the blank in the left hand column.

1. **_b_** The Sauce is canned to prevent spoilage.
2. **_d_** Sauce is sold in stores and schools.
3. **_a_** Apples grow on trees in orchards.
4. **_c_** Trucks haul the sauce to stores.

a. production
b. processing
c. distribution
d. retailing



5. **_a_** Cows are usually milked twice a day.
6. **_d_** Students buy milk at school.
7. **_c_** Milk is taken from the processing plant to stores.
8. **_b_** Milk is put in bottles or cartons.

a. production
b. processing
c. distribution
d. retailing

TRUE OR FALSE:

9. **_True_** Aluminum foil and sauerkraut both result from production and processing.

10. **_True_** The food you eat results from the work of many people doing different jobs.

Name_____Date_____

CAREERS

List each career in the proper column. If you can think of some careers that are not listed, you may add them also.

PRODUCTION ***PROCESSING***

_____ _____

_____ _____

_____ _____

DISTRIBUTION ***RETAILING***

_____ _____

_____ _____

_____ _____

Farmer
Truck driver
Store clerk
Cooker operator
Fruit picker

Shelf stocker
Railroad engineer
Restaurant owner
Factory owner
Plant manager

Name: **ANSWER KEY** Date: _____

CAREERS

List each career in the proper column. If you can think of some careers that are not listed, you may add them also.

PRODUCTION	***PROCESSING***
FARMER	COOKER OPERATOR
FRUIT PICKER	FACTORY OWNER
_____	PLANT MANAGER

DISTRIBUTION	***RETAILING***
TRUCK DRIVER	STORE CLERK
RAILROAD ENGINEER	SHELF STOCKER
_____	RESTAURANT OWNER

Farmer
Truck driver
Store clerk
Cooker operator
Fruit picker

Shelf stocker
Railroad engineer
Restaurant owner
Factory owner
Plant manager

TEACHER MATERIALS

CONCEPTS: Social Studies - interdependence (economic p. 54)
Composition - to explain

OBJECTIVE:

1. Students will identify situations in which farmers are consumers.

2. Students will recognize interrelated industries

BACKGROUND: Agriculture is interrelated with other industries. Producers are also consumers. Farmers are producers of our food supply, but they are also large-scale consumers of items produced in other industries. A common misconception is that farmers are almost totally self-sufficient. Our modern technology has made them very dependent upon other industries and bankers. In addition, agricultural specialization has made farmers dependent upon others for a large part of their food supply.

ACTIVITIES:

1. As a class, study the picture of a farm on the cover of New York is Growing. Identify items which the farmer probably had to buy from someone else.

2. Have students work in small groups to choose other items from the picture of the farm and trace the connections which enable the farmer to have the item.

3. After reading the story of aluminum, ask the students if there are aluminum products that would be used on the farm on the cover of New York is Growing.

Examples: aluminum siding on the house and barn, automobile and truck parts, louvers on the house, storm windows and doors on the house.

4. Look at the section, "How a House is Built" on pages 16-17. Ask: "Is the farmer's house built this way?" Discuss it.

NEW YORK IS GROWING

interdependence
environment

TEACHER MATERIALS

CONCEPTS: Social Studies - interdependence (economic pp. 52, 54)
- environment (geographic p. 56)

OBJECTIVES: The students will identify the major crop and livestock regions of New York State.

BACKGROUND: The major crop and livestock areas of New York depends upon many geographical features. Day length, temperatures, terrain, soil type, and relative transportation difficulties. For example; raw fluid milk can only be transported relatively short distances or it becomes rancid. Therefore, milk for fluid consumption is produced near large population centers.

ACTIVITIES:

1) Using the information on page 7 in New York is Growing and the fact sheet "New York as an Agricultural State" identify where products are produced in New York.

2) Make a huge map of New York.

   a. Make a transparency of the map of New York.
   b. Project it onto a bulletin board.
   c. Have a student (or several) trace the map including counties.
   d. Have your best printer label each county.

3) Locate New York's Agricultural commodities on the map.

   a. Copy the pages of agricultural symbols.

b. Have the students cut them apart (they may want to color them).

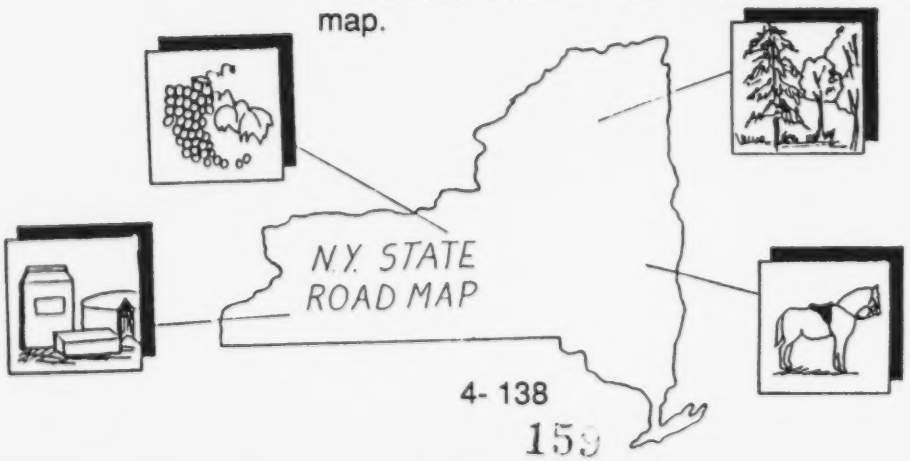
c. As a class activity have the students paste, staple, or tape the symbols to the appropriate county.

d. If they won't all fit, put extra symbols outside of the map and use colored string to indicate which counties produce those commodities.

4. The students then should attempt to determine where the left over symbols belong.

Seafoods -	Coastlines
Maple syrup -	Statewide
Horses -	Western New York Fingerlakes Area Long Island Orange County Westchester County
Ducks -	Long Island
Nurseries -	Near large urban areas
Trees -	Statewide with concentrations in the Adirondacks and Catskills

5) If it is not possible to make the map as indicated, use a New York State Road map.



NEW YORK
IS AN
AGRICULTURAL STATE

Agriculture is a major industry in New York State. More than 8.6 million acres make up New York State's 40,500 farms, farms where 90,000+ people produce a wide variety of food products. Here are some of the food products in which New York leads most other states.

DAIRY PRODUCTS-- Milk is New York's leading agricultural product and is produced throughout the State. Milk accounts for nearly 58 percent of the State's farm cash receipts from all products. Production in 1987 was 11.4 billion pounds with a total value of $1.42 billion. New York ranks 3rd nationally in milk production and in income from dairy products.

MEAT PRODUCTION--New York with 471,000 calves slaughtered during 1987 led the nation in number of calves slaughtered and ranked 3rd in total pounds of veal produced. There were 189,000 cattle, 61,000 hogs and 66,000 sheep and lambs slaughtered in 1987. The value of meat animals sold was $212 million in 1987.

HORTICULTURE--In New York, greenhouse and nursery products had a cash value of about $208 million in 1987. Production is concentrated on Long Island and elsewhere close to heavily populated areas. These products are grown on more than 20 thousand acres and under about 18 million square feet of glass or other protection. New York ranks 6th in income from greenhouse and nursery products.

EGGS--An important segment of the State's agriculture, with 1987 production valued at $46 million. Production is spread throughout the State but is intensive in Sullivan County. New York ranked 20th in egg production in 1987.

APPLES--New York ranked 3rd in the nation in apple production in 1987. The crop is valued at about $74 million at the packing house door. Three general areas produce the apple crop: along the southern shore of Lake Ontario, the Hudson Valley counties of Columbia, Dutchess, Ulster and Orange, and the Lake Champlain Valley, mostly in Clinton County.

GRAPES--Grapes were a $41 million crop in 1987, with most going for juice and wine. Production centers in Erie and Chautauqua Counties, in the Finger Lakes region (Yates, Steuben, Ontario, and Schuyler Counties), in the Mid-Hudson Valley, and on Long Island. New York ranked 3rd in grape production in 1987.

TART CHERRIES--Produced mostly in the Lake Ontario region of Western New York. Production and value of the crop fluctuates widely. New York ranked 2rd nationally in 1987 with the crop bringing $2.3 million to New York State producers.

CABBAGE--Principally grown south of Lake Ontario in Orleans, Monroe, Wayne and Ontario Counties. This is the center of production of cabbage grown for kraut as well as cabbage for storage, which is subsequently moved to the fresh market during the winter months. Cabbage is also grown in Suffolk County and in other sections of the State. Value of the crop grown in 1987 was about $32 million. New York ranks 1st in production of cabbage for kraut and 3rd in cabbage for fresh market.

ONIONS--An important crop, valued at $41 million in 1987. Mostly grown in muck soils in Orange, Oswego, Orleans, Genesee and Madison Counties. The state ranked 6th in production in 1987.

SNAP BEANS--Grown in the Central and Western parts of the State largely for the canning trade. The 1987 value of the crop was $17 million. New York ranks 3rd in production for both fresh market and processing.

SWEET CORN--Produced throughout the State with concentration in the lower Hudson Valley and in Western and Central New York in Genesee, Monroe, Madison, Ontario, Orleans, Erie and Yates Counties. The 1987 production placed New York 2nd in fresh market and 5th in processed tonnage. Total value was about $33 million.

TOMATOES--Largest production is in Western New York for fresh market and processing use. New York's 1987 fresh market value was about $9 million.

OTHER VEGETABLES--Lettuce (worth $10.1 million), cauliflower (worth $8.3 million), celery (worth $3.6 million), carrots (worth $5.6 million), green peas for processing (worth $4.2 million) and beets for processing (worth $1.7 million) are grown in the State. Lettuce and celery are grown in the muck soils of Orange and Oswego Counties. New York ranks 2nd in beet production for processing, 4th in cauliflower, 4th in celery, 6th in lettuce, 5th in green peas for processing and 8th in carrots.

GRAIN--New York also has significant production of several grain crops. Corn, oats and wheat are the most widely grown in the State. New York is 16th in acreage of corn, 2nd in corn silage production and 17th in corn for grain. The State places 11th in oat production and 34th in winterwheat.

HAY--Production valued at $385 million in 1987. New York ranks 10th in all hay but is 6th in production of clover and grass hay. Most of the hay is used on the farms where produced and the value realized through the sale of milk and livestock.

POTATOES--Production is centered in eastern Suffolk County (Long Island) and in Steuben County with scattered production in other areas of the State. Value in 1987 was $46 million. The State ranks 11th in production.

DRY BEANS--Grown in Western New York and valued at $7.2 million in 1987. New York ranks 11th in production.

MAPLE SYRUP--A $5.2 million crop in 1987 and ranking the State 2nd in production after neighboring Vermont.

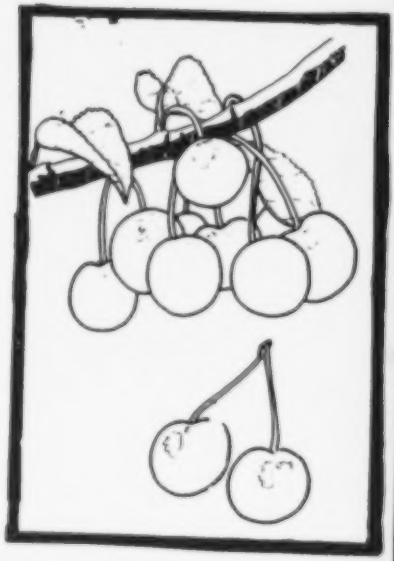
NY Agricultural Statistics Service/NYS Department of Agriculture and Markets
1 Winners Circle, Capital Plaza, Albany, New York 12235
May 1988

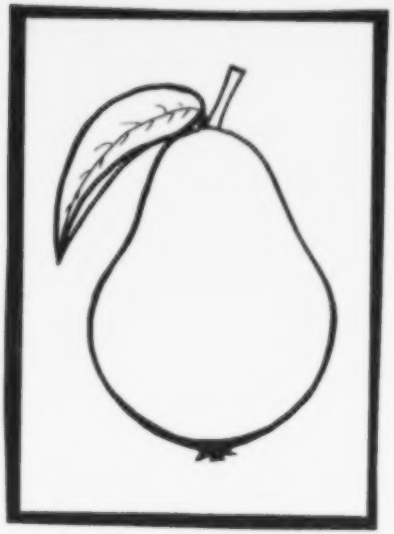
ST.LAWRENCE
FRANKLIN
CLINTON
ESSEX
JEFFERSON
LEWIS
HAMILTON
WARREN
WASHINGTON
OSWEGO
ONEIDA
HERKIMER
FULTON
SARATOGA
NIAGARA
ORLEANS
MONROE
WAYNE
GENESEE
ONONDAGA
MADISON
MONTGOMERY
SCHENECTADY
RENSSELAER
ONTARIO
ERIE
WYOMING
LIVINGSTON
YATES
SENECA
CAYUGA
CORTLAND
OTSEGO
SCHOHARIE
ALBANY
CHAUTAUQUA
CATTARAUGUS
ALLEGANY
STEUBEN
SCHUYLER
TOMPKINS
CHENANGO
COLUMBIA
GREENE
CHEMUNG
TIOGA
BROOME
DELAWARE
ULSTER
SULLIVAN
DUTCHESS
ORANGE
PUTNAM
WESTCHESTER
ROCKLAND
BRONX
NEW YORK
SUFFOLK
RICHMOND
NASSAU
KINGS
QUEENS

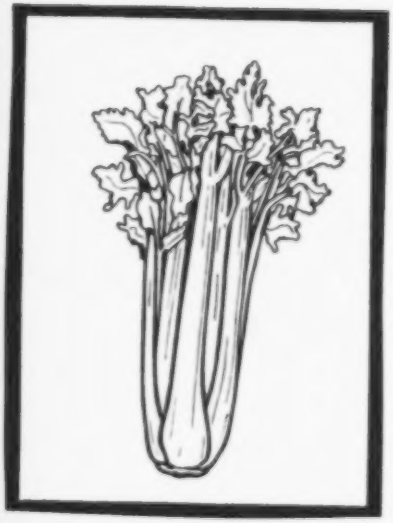
NEW YORK AS AN AGRICULTURAL STATE

Product	Area Where Grown in Large Quantities
Carrots	Yates County.
Cauliflower	Erie, Delaware, Monroe, Onondaga, and Suffolk counties.
Celery	Orange, Oswego, and Wayne counties.
Cherries	Chautauqua, Columbia, Monroe, Niagara, Orleans, Schuyler, Ulster, and Wayne counties
Dried Beans	Cayuga, Genesee, Livingston, Monroe, Ontario, Orleans, and Wayne counties.
Eggs	Widespread, but many farms in Sullivan, Allegany, Cayuga, Chenango, Erie, and Wayne counties.
Grapes	Erie, Chautauqua, Yates, Steuben, Schuyler, Ontario, Cattaraugus, Columbia, Niagara, Seneca, and Wayne counties.
Maple Syrup	Schoharie County and Adirondack Region.

Milk and Dairy Dairy Products	Generally throughout the state, but the leading counties are Cattaraugus, Chautauqua, Chenango, Cortland, Delaware, Herkimer, Jefferson, Lewis, Madison, Oneida, Otsego, St. Lawrence, Steuben, Washington, and Wyoming counties.
Pears	Columbia, Dutchess, Monroe, Niagara, Orange, Orleans, Oswego, Ulster, and Wayne counties.
Potatoes	Suffolk, Steuben, Wayne, Wyoming, Oswego, Orleans, Cayuga, Erie, Franklin, Genesee, Livingston, Madison, Monroe, and Oneida counties.
Snap Beans	Cayuga, Erie, Genesee, Monroe, Oneida, Orleans, Wayne, and Yates counties.
Sweet Corn	Cayuga, Dutchess, Erie, Genesee, Livingston, Monroe, Ontario, Orleans, Suffolk, Ulster, Wayne, and Yates counties.
Tomatoes	Albany, Chautauqua, Erie, Monroe, Niagara, Onondaga, Orange, Orleans, and Suffolk counties.







TEACHER MATERIALS

CONCEPTS

Social Studies - change (social p. 40)
(economic p. 52)
- culture (social, pp. 44, 46, 48)
- interdependence (economic p. 52)

Reading - for comprehension
- vocabulary

Science - Life Science - I A - 1.5
I B - 1, 2
II A - 1.3

OBJECTIVE: The students will be able to describe the uses of plants during our colonial period.

BACKGROUND: In colonial America, 98% of the population was farming the lands of the newly formed United States of America. Most of these people were, by necessity, self sufficient. They grew or made most of what they needed. Money was scarce and often unreliable, trade between the states difficult. Imported goods were for the affluent city dwellers. Herbs grown at home flavored food, provided fragrances, and dyed homespun cloth. The oils from mints spiced foods and medicated. Herbs were sometimes the only remedies for ailments. For many years experts have scoffed at the use of herbs for medicine. Today a rebirth of herbs as more than flavorings is seen in the U.S. Many medical specialists are testing herbal remedies for their effectiveness and safety. Cures for today's diseases may be found in yesterday's tonics.

ACTIVITIES:

1) Have the students read "Plants and the Colonies" and pp. 24 and 25 in *New York is Growing*.

2) Have the students complete the word find and the crossword puzzle.

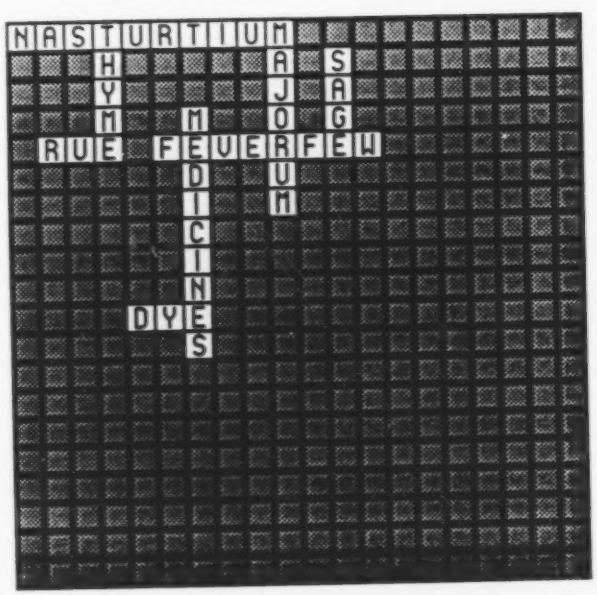
3) Raise some herbs or edible flowers (violets and nasturtiums) as a class project and for a science unit.

4) Make a colonial meal to celebrate the Constitution signing, Washington's Birthday, or Jefferson's Birthday. Use the colonial recipes found with this lesson. Include herb teas, strewing herbs and flowers to set the atmosphere.

5) Visit an herb garden or bring an herbalist into the class.

6) **Caution students that not all flowers and plants can be eaten.... some are poisonous!**

Answers: HERBS

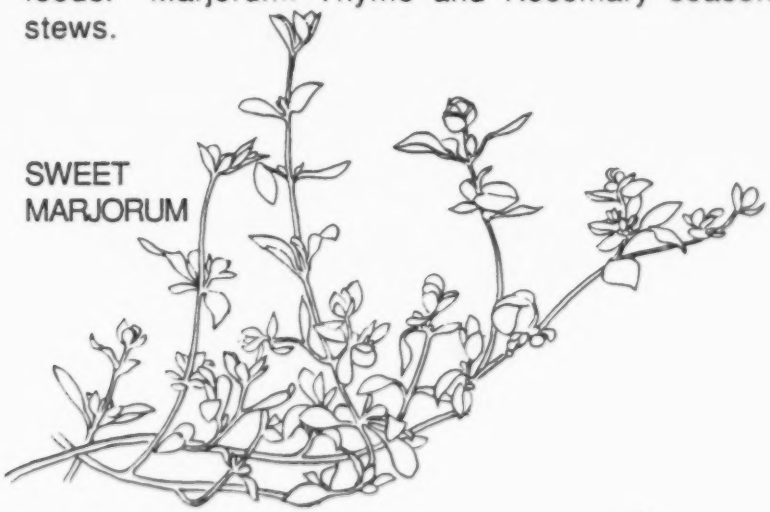


PLANTS AND THE COLONIES

Plants had many uses in the American Colonies. Of course, plants were used as food. Most of the population of the U.S. was farming. People were only one harvest away from starving. All that a family needed they produced. Fiber from plants was spun into thread and woven into cloth. It was called "homespun". But, did you know that plants were also used to flavor foods and more? More? Yes; to dye cloth, for oil, for their scent, to preserve food, as tea and most importantly... as medicines! Early American settlers needed herbs.

Flavorings

Early colonists grew and dried their own herbs because of the great distance from markets. Some of these herbs flavored foods. Marjorum. Thyme and Rosemary seasoned meats and stews.



SWEET MARJORUM

THYME

ROSEMARY

Sage flavored fowl such as wild turkey, duck, chickens, and other birds. Most of the fowl eaten was hunted. Sage was also used to season other wild game or brewed to make tea.

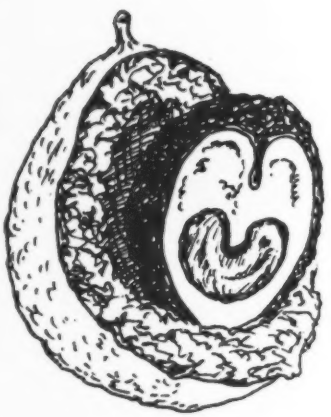
When sugar wasn't available, herbs replaced it. Herbs also spiced preserved foods.

SAGE

Most important to the colonists, herbs covered the flavor of spoiled meat. Meat storage was very poor and food was scarce. In warm weather, fresh meat would often spoil. The early Americans often ate rotting meat. They had little choice. Herbed sauces covered the rotted flavor.

Dyes

Dyes from herbs and other plants were important in colonial times. Madder made red dye. The madder root can create fifty different shades of red. This was the primary source of red for calico. Indigo was grown in the south. This plant dye was brought north and used to dye wool, cotton and linens blue. Onion skins and Tansy made yellow dye. Walnut and Butternut husks made shades of brown. Many dye materials and techniques were learned from the Indians.



BLACK WALNUTS

SPEARMINT

Oils

Oils and fats were scarce and valued. Oils could come from herbs. Peppermint, wintergreen, spearmint and horehound oil were removed from the plant's leaves.

Oils could also be removed from nuts and flowers. Lavender oil was a common scent.

LAVENDER

Scents and Flowers

Herbs and flowers which had strong scents were important. There were "strewing herbs" such as tansy, lavender, and feverfew. These were strewn about to improve the smell of homes and churches.

Two hundred years ago, people even ate flowers. Violets were crystallized and eaten. Other flowers were used to spice up and color fresh salads. One of these was nasturtiums. Rose hips (seed pods) made tea. Violets, nasturtiums, and roses were important for their fragrances and all were made into jelly.

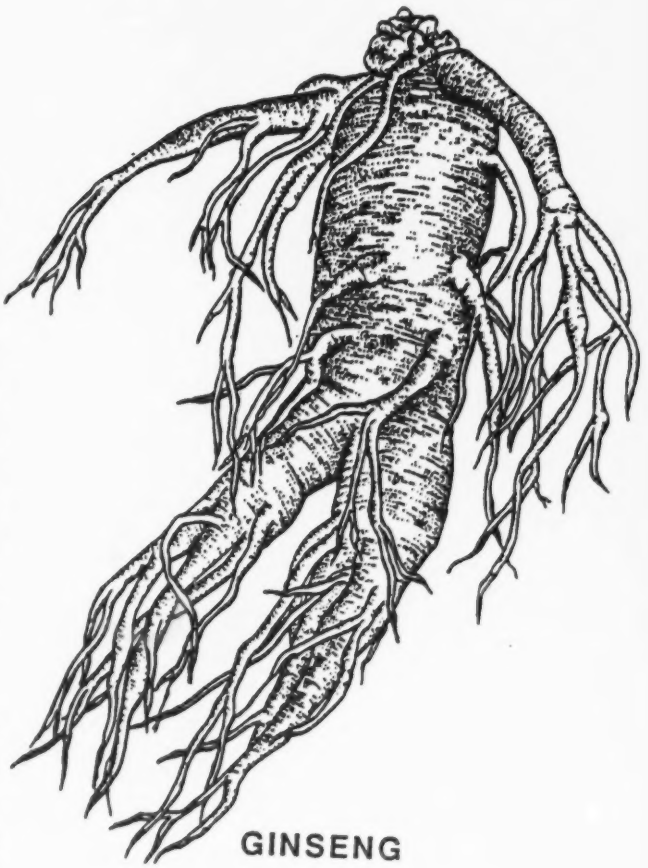
VIOLET

Colonial homemakers kept "tussy-mussies" in their homes. These herbal bouquets came with the settlers from England. They were carried by judges to ward off "jail-fevers". Rue and Southerwood were thought to protect people against plague. English Pennyroyal was used to stop lice. Other herbs were used to chase away insects. Many of

these herbs had strong scents. Some were not very pleasant smelling.

Medicines

Herbs chased away insects and fevers. They also served as medicines and disinfectant. Rue chased away flies, bedbugs, and disease. Valerian was made into a tea to calm the nerves. Lungwort was good for lungs. Ginseng (shaped like a human body) was thought to be good for the whole body. Red herbs were thought of as good for the blood. This was based on the fact that blood and the herbs were both red, nothing else.



GINSENG

Feverfew was brewed into a tea to lower fevers. It was also used to calm the nerves. Today, Feverfew is being retested as a fever remedy. It may be as effective as aspirin without side effects.

While effective, most herbs used for medicine were also poisonous. An overdose would cause the early death of the patient.

The use of herbs faded with the Victorian era. But, since the 60's, America has seen the rebirth of herbs. Shoppers pay top dollar for herbal tea. Fresh basil, parsley and other herbs are in demand. Gourmet cooks keep bouquets of fresh herbs on hand. Many kitchen windows hold potted herbs. While many of the ancient claims are false, new interest has sparked testing. Research to prove or disprove old claims may help us find new (old?) cures for today's diseases.

Some of the following recipes might be combined into a holiday brunch, dinner or party to celebrate the founding of our long-lasting republic. Each recipe serves 6-8 people.

RED FLANNEL HASH

4 medium beets, cooked
2 large potatoes, cooked
1 1/2 lbs. cooked roast beef or corned beef, minced
2 tablespoons butter or margarine, divided
1 large onion, chopped
1 tablespoon cream
poached eggs (optional)

Mash beets and potatoes together. Add beef and mix well. Melt 1 tablespoon butter or margarine in a large skillet and add onion. Cook until onion is tender by not brown. Stir in the meat and vegetable mixture and cook over low heat for about 12 minutes. Spread evenly in a flat baking dish. Melt 1 more tablespoon of butter and mix with cream. Brush this mixture over the hash and brown under a broiler until a golden crush has formed. Serve with a poached egg on top of each serving, if you wish.

SALMAGUNDY

3 cups cooked chicken, cut into strips
2 chopped hard boiled eggs
2 large potatoes, cooked and diced
1 tablespoon chopped parsley
1/2 cup salad oil
1/4 cup white wine vinegar
12 white pearl onions, boiled
2 large potatoes
Lettuce leaves
Grapes or flowers for garnish (optional)

Mix together chicken, eggs, anchovies, parsley, salt oil, vinegar, salt and pepper. Add onions and potatoes and mix well. Serve over lettuce leaves. Garnish with grapes or flowers, if you wish.

SUMMER SUCCOTASH

1 1/2 cups cooked fresh or frozen corn
1 1/2 cups cooked fresh or frozen lima beans
2 tablespoons butter or margarine
6 tablespoons table cream
1/2 teaspoon salt
pepper to taste

In a medium large saucepan, melt the butter or margarine. Add remaining ingredients. Heat gently until hot and serve.

INDIAN PUDDING

2 1/2 cups milk
3 tablespoons corn meal (Indian meal)
1/2 cup molasses
1/2 teaspoon ground cinnamon
1/4 teaspoon ground ginger
1/2 teaspoon salt

Heat milk in a medium saucepan until it is scalded (tiny bubble appear around the edge), but does not boil. Add cornmeal, a tablespoon at a time, stirring after each addition. Add molasses. Cook over low heat 10-15 minutes, stirring frequently until thickened.

Add cinnamon, ginger and salt. Pour mixture into greased casserole and bake at 300° F for 45 minutes. Serve warm or cool, topped with vanilla ice cream if you wish.

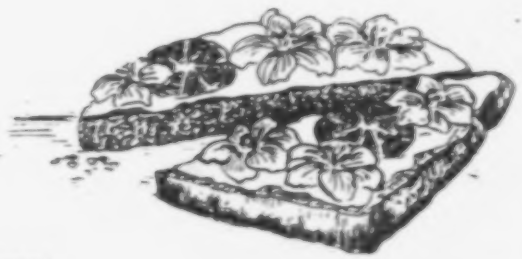
EATING FLOWERS

Nasturtium Sandwiches*

1. Pick nasturtium blossoms and the cleanest round leaves.
2. Wash each and dry gently.
3. Spread light brown bread with softened cream cheese.
4. Press the leaves or blossoms in place on top of the cream cheese.
5. Cut into fancy shapes to serve.

   These have wonderful peppery flavor. The nasturtium symbolizes patriotism.

*Recipe from The Herb Quarterly, no. 29, Newfane, Vt. Spring 86.



VIOLETS

Add the flowers and leaves of the sweet violet to salads, freshly picked, washed and dried. Don't try to remove the stems and calyx as it is almost impossible.

CRYSTALLIZED VIOLET FLOWERS

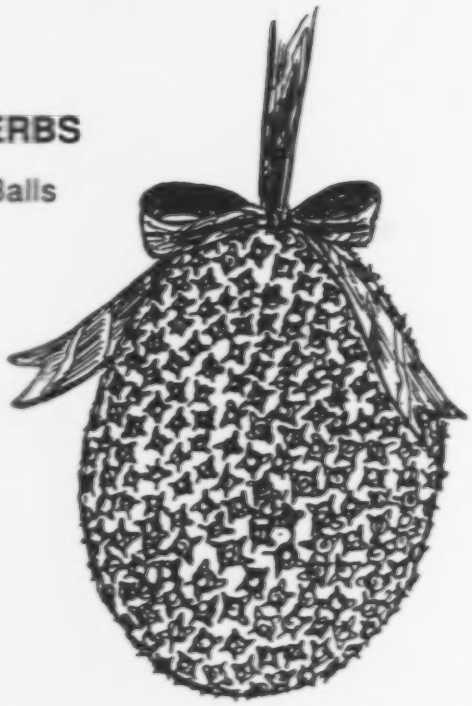
1. Pick violet flowers in the morning after the dew has dried.
2. Dip each blossom in lightly beaten egg white.
3. Then dip each in powdered or table sugar.
4. Dry the flowers slowly in a 200° F oven until crisp. This may take 20-30 min. depending upon the humidity.
5. Store in a glass jar if not using immediately.
6. Use the flower to decorate desserts.

TEAS

Use of any number commercially available herb teas. A tea with rose hips would be a good idea.

SCENTED HERBS

*Pomander Balls



1 thin-skinned orange, lemon lime or apple

1/2 cup Ground Cinnamon

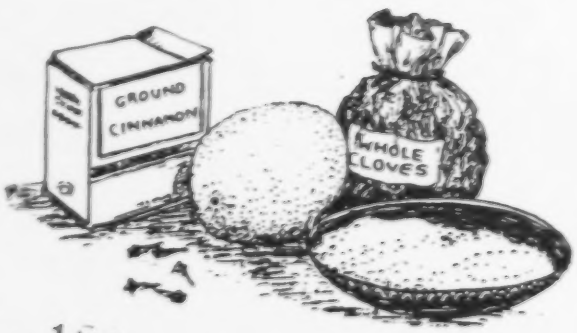
1/4 cup Powdered Orris Root

Fresh Whole Cloves

1 Aluminum Nail

Puncture the skin of the fruit with the sharp end of the nail and insert a clove into it. Continue in this manner until the fruit is covered, placing the cloves close, but not touching. Roll the mixture in the Orris Root-Cinnamon mixture, coating it well. Place in a shoe box. Store it in a dark, dry place to "cure". In 4-6 weeks, the fruit will become a pomander ball. It may then be placed with others in a wooden bowl, placed in a drawer, and hung form a window or in a closet.

Pomander Balls were carried by our forefathers to fend off the unpleasant odors of the street.



BASIC POTPOURRI*

2 cups rose petals

1/4 cups lavender buds

1 cup mint leaves

2 T ground Orris Root

2 T cinnamon

2 T Allspice

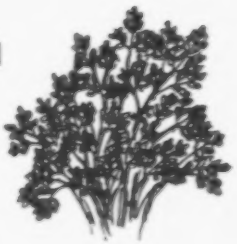
8 drops Essential oil (found in craft shops)

Dry flowers and leaves well. Mix with spices, Orris Root and essential oil. Cover tightly and store in a warm dry place for 4 weeks. Stir it occasionally. Choose the scent of the essential oil to complement the occasion. Fill an attractive jar or basket with the potpourri.

* Adapted from The Herb Quarterly, no 28, Newfane, Vt., Winter 1985-86. pp. 29-30.

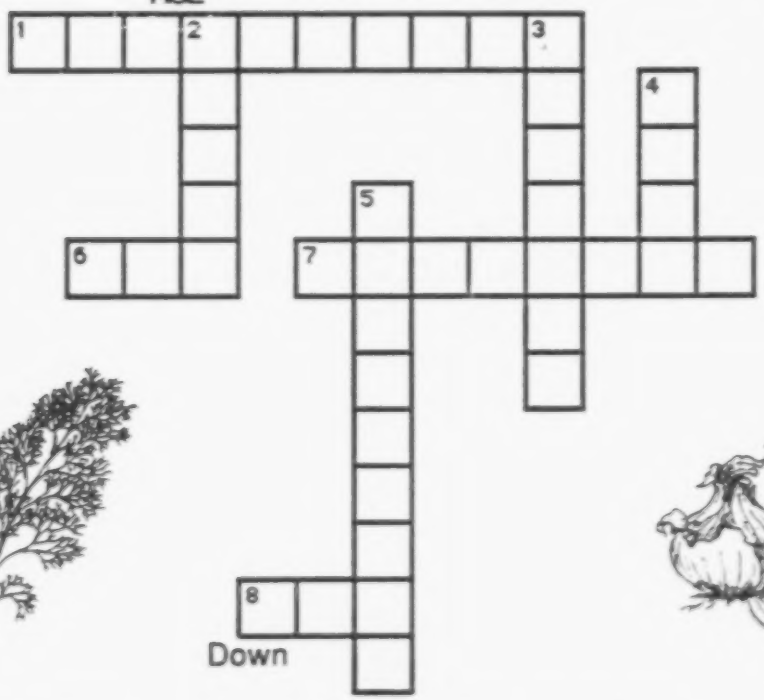
Name _____ Date _____

HERBS



Directions: Use this word list to complete the crossword puzzle:

DYE	MEDICINES	SAGE
FEVERFEW	NASTURTIUM	THYME
MAJORUM	RUE	



Across

1. Roses, _____ and lavender were used as fragrances and for jelly.
6. _____ and Southerwood were used to ward off the plague.
7. _____ was brewed into a tea to lower fevers.
8. Madder, indigo, and onion skins were boiled to _____ cloth.

Down

2. Majorum, rosemary, and _____ flavored meat and stew.
3. often used with rosemary and thyme
4. _____ flavored fowl, wild game and was used for tea.
5. Herbs were also used as _____ and disinfectants.

Name _____ Date _____

Find these herbs in the puzzle below. They may be across, up, down, on the diagonal, forward or backward.

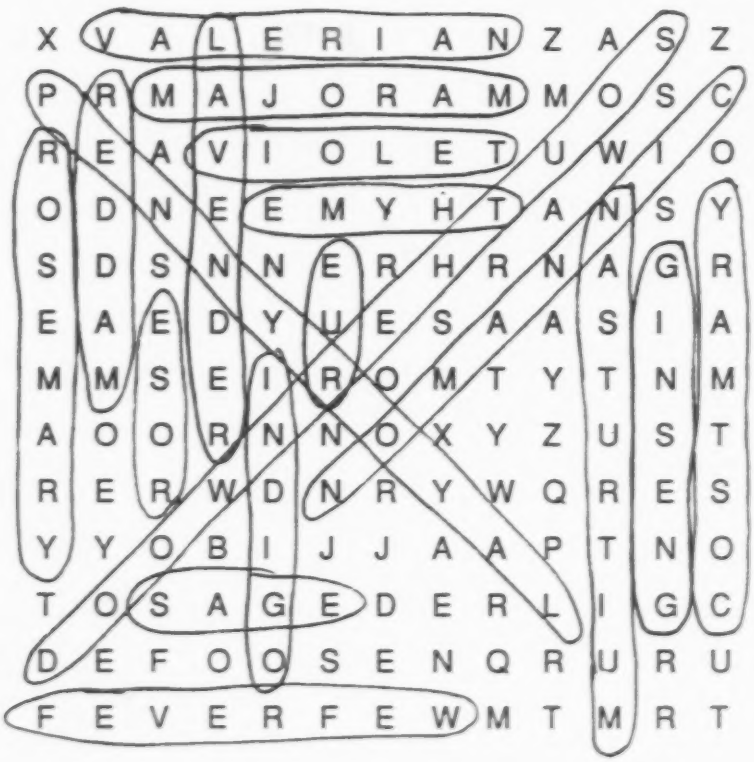
MAJORUM	THYME	ROSEMARY	SAGE
LAVENDER	FEVERFEW	COSTMARY	MADDER
SOUTHERNWOOD	INDIGO	RUE	NASTURTIUM
VIOLET	GINSENG	CINNAMON	ROSE
VALERIAN	PENNY ROYAL		

X V A L E R I A N Z A S Z
P R M A J O R A M M O S C
R E A V I O L E T U W I O
O D N E E M Y H T A N S Y
S D S N N E R H R N A G R
E A E D Y U E S A A S I A
M M S E I R O M T Y T N M
A O O R N N O X Y Z U S T
R E R W D N R Y W Q R E S
Y Y O B I J J A A P T N O
T O S A G E D E R L I G C
D E F O O S E N Q R U R U
F E V E R F E W M T M R T

Name ***ANSWER KEY*** Date _____

Find these herbs in the puzzle below. They may be across, up, down, on the diagonal, forward or backward.

MAJORUM	THYME	ROSEMARY	SAGE
LAVENDER	FEVERFEW	COSTMARY	MADDER
SOUTHERNWOOD	INDIGO	RUE	NASTURTIUM
VIOLET	GINSENG	CINNAMON	ROSE
VALERIAN	PENNY ROYAL		


X V A L E R I A N Z A S Z
P R M A J O R A M M O S C
R E A V I O L E T U W I O
O D N E E M Y H T A N S Y
S D S N N E R H R N A G R
E A E D Y U E S A A S I A
M M S E I R O M T Y T N M
A O O R N N O X Y Z U S T
R E R W D N R Y W Q R E S
Y Y O B I J J A A P T N O
T O S A G E D E R L I G C
D E F O O S E N Q R U R U
F E V E R F E W M T M R T

The First Tile Dra

The first drain tile in the United States were installed by John Johnston of Geneva, New York, in the period from 1835 to 1838.

John Johnston had seen farmers in Scotland burning tile in the field before he came to the United States, and read with interest the reports of tiling in England. He was convinced tiling would improve his crops in the United States.

In 1835 he imported patterns for drain tile from Scotland and approached B. F. Whartenby of Waterloo, New York, who began manufacturing tile by the most primitive methods in 1836. These tile were manufactured entirely by hand. The plastic clay was rolled into sheets much the same as cookie dough is rolled and was about one-half inch thick. The sheets were cut into rectangles of a desired size. Those for two inch tile were about seven inches wide and those for three inch were about eleven inches wide. These rectangles of clay were bent over a pole, or form, of the requisite size and allowed to dry, making a horseshoe shape. The dried tile were baked in the pottery kiln.

An article in the Rural New Yorker on September 19, 1857, stated, "As materials for draining purposes, we think nothing has yet been brought forward superior to tile. We find in them two of the requisites of the formation of a good drain - durability and portability." "The ingress of water is free and the passage of all moisture is equally ready. Vermin cannot injure them as readily as almost any other kind of drain." An author of the day said, "A good drain, made of clay and well burnt, properly laid on a uniform descent, and having a good outlet is practically as permanent as the earth in which it is imbedded."

John Johnston's efforts were not without their detractors. Johnston wrote in a report to the New York State Agriculture Society,

"I commenced under unfavorable circumstances in different ways. First, for want of funds; next, the tile cost double what they now do, and digging double and last, though not least, public opinion was very much against me.

Some would ask me if I was going to put crockery all over my farm? Some would tell me they thought my farm was rather too dry if anything; and some of my own country men would give me the hint that they had had known some men drain and otherwise improve their lands so that they lost them. Even a Judge Cheever, and a Professor Emmons, in a public discussion on agriculture, thought it might be

John Johnston at about the time h

FIRST TIL

Pattern tile brought to Ame

inage in America

originated tile drainage in America.

IN AMERICA

ca by John Johnston in 1835

practicable to expend twenty to twenty four dollars an acre on draining in the humid climate of Great Britain, but thought it questionable if it was prudent for Mr. Johnston to expend so much in this dry climate." "Not withstanding all this, I still felt confident that my draining could end well if I lived, as the excess of two years' crops after draining would pay the cost, and I persevered, and the more I drained the more I was convinced I was right, and I have not been disappointed at the result, as my fondest anticipations have been realized."

As an indication of Johnstons' efforts, consider the presentation following. Charles Rose Mellen had purchased the Johnston farm, from one of Johnston's daughters, after Johnston's death. He spoke at a meeting of the New York State Drainage Association of February 19, 1912. His topic was, "The History and Results of Seventy Years of Drainage on the John Johnston Farm." He said, in part, "A few years ago I sold 518 bushels of shelled green peas grown on ten and one-half acres to one of our local canning factories. It was an unusually wet season and rained almost incessantly just at the time we harvested the earliest varieties. I believe that unless this land had been underdrained, it would have been impossible to have harvested them. We cut them with a five foot mower with windrow attachment and then threw them, vines and all, on the wagons. I weighed one of the loads drawn out of the field, as wet as it was, by one team, and the gross weight was 6750 pounds. My wagons, however, are equipped with four inch and six inch tires. This load was on a four inch tire. Some land not far from my farm was so wet they could not operate a mower on it to say nothing of drawing a load of two and one-half tons over it." This was on land tiled by John Johnston some 60 to 75 years before. Both the materials and the workmanship must have been good."

These facts are from "History of Tile Drainage" by Marion M. Weaver, Waterloo, New York; Member American Society of Agricultural Engineers

Milk from Cow to You

Guide

For the Teacher or Leader

The *Milk from Cow to You* poster and the handouts are designed to introduce children in the intermediate grades to the production, processing, and distribution of milk. These materials can be used in such curriculum areas as health, science, and social studies. They can also be used to introduce or summarize a trip to a dairy farm or a processing plant.

The 44 x 56 inch poster highlights the important steps that protect the high-quality, safety, and flavor of milk.

The 11 x 16 inch handout reviews the steps in the milk delivery system and features some interesting milk facts on side 1; and, introduces a variety of dairy products made from milk on side 2. It may be used:

—As a review after the poster lesson is taught.
—As a follow-up to the poster at some later date.
—As an independent reading assignment.

Two approaches used in the teaching plan are discussion and questioning. When there is a correct answer, it is printed in italics after the question.

Using the Poster

Vocabulary

The following terms are defined in the Teaching Plan:

Cow	Holstein	Nutritious	Raw milk
Crop	Insulated	Pasteurize	Refrigerated
Dairy	Milk	Pasteurizer	Silage
Grass	Milking machine	Ration	Silo

Teaching Materials

Teacher:

—*Milk from Cow to You* poster
—2 large sheets of blank paper
—4-6 large paper clips or clothespins
—clear, drinking glass
—carton of milk

Each Child: (optional)

—½-pint carton of milk or glass of milk

Advance Preparation

—Review the suggested Teaching Plan to familiarize yourself with the lesson.
—On the day you teach the lesson, mount the poster where it will be visible to all the children in class.
—Experiment clipping the blank papers to the poster with the clothespins as suggested in step 4 in the Teaching Plan.
—Make arrangements for obtaining a clear glass and a carton of milk for the day you teach this lesson.
—Optional: Make arrangements to serve cold milk to each child at the end of the lesson. One gallon of milk serves 16 children ½-pint each.

Teaching Plan:

1. Begin the lesson by pouring some fresh milk into a clear glass. Hold the glass of milk up and ask:

   —How many of you drink milk?
   —What is milk? *White liquid food*
   —What do you know about milk?
   —Where does milk come from? *Cows*

2. Start a list of vocabulary words by writing "milk," "cows," "crop," and "dairy" on the chalkboard. Ask:

   —What do you know about cows?
   —How do you think milk gets from cows to you?
   —What steps do you think have to take place?

   Note: *Accept all responses. These questions are to trigger thinking rather than correct responses.*

3. Show the children the *Milk from Cow to You* poster. Explain that the poster shows the most important steps in getting milk from the cows to them.

4. Use the blank paper and clothespins to cover all but the first panel.

Introducing the First Panel

5. Point to the top panel and ask:

   —What kind of farm is this? *A modern dairy farm*
   —What does "dairy" mean? *Having to do with milk*
   —What does the word "crop" mean? *A plant or animal that is raised or harvested to earn money*
   —What is the dairy farmer's crop? *Milk*
   —How can you tell? *There are cows*
   —Do you know what type of cows these are? *Holsteins*

6. Add the word "Holsteins" to the chalkboad and ask:

   —Can anyone name any other breeds of dairy cows? *Guernsey, Jersey, Brown Swiss, and Ayrshire*

7. Point to the cows on the poster and ask:

   —Why do we call all dairy cows "she"? *Because only female cattle give milk*
   —What are the males called? *Bulls or steers*
   —How much do you think 1 of these Holsteins weighs? *About 1500 pounds*

8. To give the children an idea of how much 1500 pounds is, compare their weights to a Holstein's weight.

Ask the children to write their weights on slips of paper. Collect the slips and read the weights aloud. Have the children keep a running total of the weights until it adds up to 1500 pounds. How many children does 1500 pounds include?

9. Read or ask 1 of the children to read the top panel's caption, "Milk comes from healthy, well-fed cows." Point to the pasture area and ask:

   —What are these cows eating in the pasture? *Grass*

   Point to the cows at the feeding trough and ask:

   —What do you think the farmer is feeding the cows?

10. Add the terms "nutritious," "grass," "ration," "silage," and "silo" to the vocabulary list and ask:

    —What does "nutritious" mean? *Something that's good for you; helps you grow; helps you be healthy; gives you energy; has nutrients*

11. Explain to the children that:

    —The nutritious food the farmer is feeding the cows is called a "ration."
    —A ration is mixed grains, minerals, and silage.
    —"Silage" is a mixture of chopped green grasses and such foods as green corn or beans.
    —This mixture of foods is called silage because it is stored in a silo.

    Point out the silos on the poster. They are the cylinder-shaped structures behind the barn.

12. Tell the children that for the cows to give a lot of milk, the dairy farmer must feed them a lot of good, nutritious food and water. Ask the children:

    —How many pounds of food do you think a well-fed cow eats each day?

13. Explain to the children that:

    —A well-fed cow eats about 90 pounds of food.
    —She also drinks 25-50 gallons of water a day.
    —If people ate like cows, they would eat about 360 hamburgers and drink 400-800 glasses of water each day.
    —It takes a cow about 6½ hours to eat and drink all her food. That's longer than our school day.

14. Point to the veterinarian and read the accompanying caption. Then ask the children:

    —What is "vet" an abbreviation for? *Veterinarian*
    —What is a veterinarian? *An animal doctor*
    —What do you think the veterinarian does for the cows? *Gives shots and check ups; gives medicine; helps deliver calves*
    —Why do you think dairy cows should be healthy?
    —Why would a healthy cow give more milk than an unhealthy cow?

15. Continue the questioning by asking:

    —How many glasses of milk do you think a healthy, well-fed cow makes each day?

    Tell them that:

    —Not all cows make the same amount of milk.
    —Cows that eat only grass make about 48 glasses (12 quarts) of milk a day.
    —Cows that eat grass and a ration, however, may make 100 glasses (25 quarts) of milk a day.
    —If we had our own well-fed cow, how many glasses of milk could each of you have to drink? *100 glasses divided by the number of children*

16. Tell the children:

    —The dairy cow is an incredible animal.
    —She is nature's very own milk factory.
    —Her body changes the grass and ration she has eaten into nutritious and delicious milk.
    —All the time, even when she's sleeping, her body is changing the food she eats into milk.
    —This also means that each and every day, dairy farmers must harvest their crop.
    —Or, put another way, the dairy farmers must milk the cows at least 2 times every day.

17. End the discussion of this panel by asking:

    —How do you think the milk is collected from cows?

Introducing the Second Poster Panel

18. Reveal the second panel by moving the cover down. Read or have the children read the caption, "Milk is collected and cooled in the milking parlor."

19. Ask the class:

    —How were cows milked 100 years ago? *By hand*
    —How are most cows milked today? *By milking machines*
    —Why do dairy farmers use milking machines?

    Tell the children:

    —It takes 1 person about 1 hour to milk 6 cows by hand.
    —By using milking machines 1 person can milk 100 cows in 1 hour.

20. Point to the cow's udder on the poster. Explain that milk is made in the udder and comes out through 4 teats.

    Point to the picture of the farmer washing the cow's udder. Read the accompanying caption.

21. Explain that:

    —A cow must be calm before she can be milked.
    —A hurt or frightened cow won't let down her milk.

22. Focus the children's attention on the milking machine and tell them:

    —There are 4 cups on each milking machine unit.
    —They fit on the teats and gently squeeze out the milk.
    —The fresh milk is just as warm as the cow's body.
    —The pipes colored pink have warm milk in them. Blue pipes carry cold milk.

23. Add "milking machine" and "refrigerated" to the word list. Read or have the children read the caption describing the milking machines. Ask:

    —What does "refrigerated" mean? *To make and keep cold*

24. Go on to read the next caption. Ask the children:

    —What happens to milk at home when it's left out of the refrigerator too long? *It gets warm; it loses freshness; it may spoil*
    —What would happen if the cow's milk wasn't chilled? *It would lose its freshness; start to spoil*

25. Explain that:

    —Dairy farmers take special care to keep milk cold.
    —They also take extra special care to keep their cows and milking parlors clean.
    —Before cows are milked, their udders are washed.
    —The milking machines and the walls and floors of the milking parlor are washed after each milking.

26. Read the last caption in this section.

    Point to the tank truck and ask:

    —How many of you have used a thermos® bottle?
    —What does a thermos® bottle do? *Keeps warm things warm and cold things cold*

    Explain:

    —The tank on the truck is like a giant thermos® bottle.
    —The insulated tank keeps in the cold so that the milk stays fresh.

27. End this section by having the children summarize what they've learned so far about cows, milk, and what dairy farmers do. Encourage them to use the poster and the words on the chalkboard in the summation.

Introducing the Third Poster Panel

28. Lead into the third panel by asking:

    —Where does the tank truck take the milk?

    Reveal the third panel by moving the cover down. Read the main caption, "Milk is processed for your health at the dairy plant."

    Also read the caption describing the tank truck delivery.

    Explain that dairy plant workers are very careful to make sure that the milk stays cold and clean.

29. Point to the women testing the milk samples and have the class read the accompanying caption.

    Tell the children that the people at the dairy plant make sure only the purest milk is put into containers.

30. Add the words "pasteurized" and "pasteurizer" to the chalkboard. Ask:

    —Has anyone ever heard or seen the word "pasteurized"?
    —Where? What does it mean?

    Explain that:

    —In 1856 a doctor named Louis Pasteur discovered that high temperatures killed bacteria.
    —So using heat to kill bacteria is called pasteurization after him.

31. Go on to explain that:

    —Bacteria are tiny microorganisms that are everywhere.
    —They are so very small that you need to look through a special microscope to see them.
    —Most bacteria are harmless.
    —But some bacteria can cause disease or make you sick.

32. Point to the pasteurizer and explain that it heats, holds, and chills milk in a very interesting way.

    —The left end of the pasteurizer is the chilling section.
    —The center is the warming section.
    —The right end is the heating section.

    Write "raw" on the chalkboard, and explain:

    —The cold milk from the farm is called "raw" milk.
    —After the raw milk is heated in the pasteurizer, it is called "pasteurized milk."

33. Use the poster to trace the flow of the milk. Explain:

    —The raw milk is pumped into the pasteurizer through the light blue tube in the center. (Pump at lower left)
    —In the center section the milk warms up (shown in pink).
    —From there it goes to the heater section (right end).
    —The milk is heated to 161°F (71.5°C). (The hot milk is in the red tubes.)
    —The hot milk goes on into the holding tube (red tube to the right of the pasteurizer).
    —The milk is kept at 161°F (71.5°C) for 15 seconds.
    —Then the pasteurized milk goes back through the center section into the refrigerator section (left end of the pasteurizer).
    —The refrigerated section chills the pasteurized milk to 45°F (7°C) (dark blue).

    Note: *If your children are interested, explain that the pasteurizer is energy efficient. The heat of the outgoing, hot, pasteurized milk warms the incoming, cold, raw milk in the center section of the pasteurizer.*

    The flow diverter at upper right diverts milk lower than 161°F back to be repasteurized.

34. Ask the children:

    —Why is the milk heated? *To kill any bacteria*
    —Why is it cooled after it's heated? *To keep it fresh*

35. Point to the pipe carrying the cold, pasteurized milk to the packaging machine. Read or have 1 of the children read the caption. Explain that:

    —At the dairy plant all processing is done by machines.
    —That's to make sure the milk stays clean and safe.

36. Read or have the children read the end caption. Ask:

    —Now where does the pasteurized milk go?

Introducing the Fourth Poster Panel

37. Reveal the poster's last panel and read the main caption. While you point to the delivery man, have the children read aloud the next five captions. Ask:

    —Have you ever drunk milk in these places?
    —Have you drunk milk in unusual places? Where?
    —How did the milk get there?

38. Read the first half of the last caption. Then ask:

    —Why do we say milk is super-safe? *Never touched by human hands; farmers wash cows and machines; tested over and over at the dairy plant; pasteurized*
    —Why is milk kept cold? *To taste good, so it won't spoil*
    —How is milk kept cold:

    - On the dairy farm? *Cooled and stored in a refrigerated tank*
    - While being delivered? *Tank trucks and delivery trucks are insulated*
    - At the dairy plant? *Stored in refrigerated tanks, cooled after it is pasteurized, stored in refrigerated room*
    - At home? *In the refrigerator*

    —How many of you think milk is delicious?
    —Why do we want fresh milk? *It tastes best*
    —Why do we say milk is nutritious: *It's good for you; helps you grow; helps you be healthy; gives you energy; has nutrients* (calcium, vitamin D, protein, and riboflavin.)

39. End the lesson by rereading the final caption on the poster panel stressing the cadence of the first 4 lines and using the final part of the caption to summarize the whole poster.

40. Optional: Serve milk to the children.

Using the Handout

Advance Preparation

This activity ends with a dairy products tasting party.

1. To prepare for the party, decide what dairy products to serve and the utensils needed for serving them. Determine how much food will provide each child one bite or spoonful of the foods you choose.
2. Involve the school food service manager, parents, and student volunteers in collecting/donating the dairy products for the tasting party.
3. Ask the school food service manager if the tasting party may be set up in the lunchroom. If not, have someone bring the prepared foods to the classroom.
4. Before teaching the lesson, set up or make arrangements for the food to be set up so it can be tasted immediately after completing the lesson.
5. Determine a method for distributing the food samples to the children.

Discussing the Handout

1. Distribute a handout to each child.
2. Focus the children's attention on the front side of the handout. Ask them:

    —Where did you see these pictures before? *On the poster*

    Read the 4 major headings. Have the children find these same headings on the poster.

3. Ask the students:

    —What is the first step in getting milk from cow to you? *Having healthy, well-fed cows*
    —What is the second step in the process? *Collecting milk in the milking parlor*
    —What is the third step? *Processing milk*
    —What is the last step? *Delivering milk*

4. Call on different children to read aloud the facts in each section of the handout. As each panel is read, ask students to check the fact(s) they find interesting. After all the facts have been read, ask students which fact they found most interesting and why.
5. Have the children turn to the "product cow" and ask them to call out:

    —All the different kinds of milk they can find.
    —All the different kinds of products made from milk.

6. Draw the children's attention to the cow's ribbon and ask:

    —What foods try to imitate dairy products? *Margarine (butter); whipped topping (whipped cream); non-dairy coffee creamer (half-and-half); imitation cheese food (cheese)*
    —How do you know if you're getting a real dairy product? *Read the label, look for the REAL® seal*
    —What does the REAL® seal look like?
    —What does the REAL® seal tell you? *The food is a real milk product—not an imitation*

7. After the lesson, host the dairy products tasting party by taking the class to the lunchroom or having the prepared dairy products brought to the classroom.

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